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THESIS

INTERGOVERNMENTAL UNITY OF EFFORT IN SUPPORT OF BIOLOGICAL THREAT PREVENTION

by

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September 2013

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INTERGOVERNMENTAL UNITY OF EFFORT IN SUPPORT OF BIOLOGICAL THREAT PREVENTION

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ABSTRACT

The purpose of this thesis is to examine ways to prevent the terrorist use of a biological weapon of mass destruction. Intelligence sources from around the globe report that terrorist groups are developing the capability and the intention to deliver biological weapons of mass destruction. Four coalitions of governments were studied to examine stated health security policies and reported outcome of a large biological threat incident of H1N1 global pandemic influenza of 2009–2010. This thesis presented the results and proposed methods to enhance intergovernmental connectivity and information sharing to prevent a biological threat.

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LIST OF ACRONYMS AND ABBREVIATIONS

AA	Actual Actions
AI/AN	American Indian/Alaska Native
BTA	Biological Threat Approach
CDC	Centers for Disease Control and Prevention
DoD	Department of Defense
ESF	Emergency Support Function
FDA	U.S. Food and Drug Administration
GHSI	Global Health Security Initiative
HEOF	Health Emergency Operations Facility
HHS	U.S. Department of Health and Human Services
HTU	Health Threat Unit
IA	Intended Actions
IHS	Indian Health Service
IIAS	IHS Influenza Awareness System
ILI	Influenza-like Illness
ILINET	Influenza-like Illness Network
NCAI	National Congress of American Indians
NCMI	National Center for Medical Intelligence
NEC	Navajo Epidemiology Center
NGO	Non-Governmental Organization
NHS	National Health Security
NHSS	National Health Security Strategy
NPLI	National Preparedness Leadership Initiative
QHSR	Quadrennial Homeland Security Review Report
SSA	Shared Situational Awareness
UIHI	Urban Indian Health Institute
WMD	Weapons of Mass Destruction

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EXECUTIVE SUMMARY

Intelligence sources from around the globe report that terrorist groups are developing the capability and intention to deliver biological weapons of mass destruction. This thesis examines ways to prevent the use of such weapons. Health security policies generally address intended actions of biological threat reduction; however, the actual actions of these policies occur in a space irrespective of geographical boundaries or governing jurisdictions, a space where sovereignty can clash with the sphere of influence needed to achieve a unity of effort.

This thesis examines four government coalitions' stated health security polices and reported outcomes of the 2009–2010 biological threat incident of H1N1 global pandemic influenza, and presents methods of enhancing intergovernmental connectivity and information sharing to address prevention strategies that will support the U.S. biological threat approach.

A multi-jurisdictional intergovernmental unity of effort is needed to address the many sovereign territories that could be impacted by an offensive bioweapon. The lack of an intergovernmental common language presents a challenge to applying some of the methods utilized by the EU and U.S. Tribal Nations. In the challenge of a biological threat, the U.S. must operate beyond unity of command; intergovernmental unity of effort is necessary. A common language and appropriate communication mechanisms allow for unity of effort, yet maintain sovereignty.

U.S. Tribal Nations and the EU use intergovernmental communication methods and liaison systems of lateral line leadership to produce shared situational awareness and perform necessary intergovernmental information sharing. Unlike the typical vertical command and control leadership structure, with lateral leadership the flow of information and influential decision making operates side-to-side in a system of self-governance. Thus, the EU's and tribal nations' information-sharing systems operate in a lateral line, supporting multi-jurisdictional decision making and producing intergovernmental governance methods to address large challenges.

Additionally, to produce the unity of effort in which functional shared situational awareness operates, governmental bureaucracies need connectivity. The various cultures and native languages of sovereign governing organizational structures are often invisible, yet the outcomes from intergovernmental and multi-jurisdictional barriers (such as time delays in developing decisions and implementing large scale action) are tangible. Connecting the "dots" of awareness and intelligence has been a challenge for Homeland Security. Yet, the intergovernmental shared situational awareness occurs in the space *between* the dots.

The EU's and tribal nations' resources of diverse lateral line leadership and information sharing systems of communication methods provide lessons for the U.S. This thesis recommends actions to improve (1) shared awareness of risks and threats, (2) unity of effort across all participants in the homeland security enterprise, and (3) innovation through active application of leading-edge science and technology.

U.S. intergovernmental unity of effort is enhanced across multi-jurisdictional silos of sovereignty by working cooperatively with the 10 U.S. National Health Security Strategy strategic objectives. These objectives strengthen the U.S. biological threat approach to support biological threat reduction and the potential innovation of methods of prevention of terrorist use of biological weapon of mass destruction.

Some of this thesis' recommended actions include (1) developing an intergovernmental communication mechanism with a lateral line system to enhance shared situational awareness and cross-border and homeland security global partnerships, (2) developing a medical intelligence intergovernmental support tool to simulate risk options for the deployment of biological threat countermeasures, and (3) integrating life sciences research and development for meta-intelligence products to improve biological threat countermeasures decision making.

Intergovernmental shared situational awareness is powerful. The U.S. can enhance its intergovernmental leadership and unity of effort by taking action on lessons learned from the European Union and the U.S. Tribal Nations.

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A final thank you goes to those who actually read this thesis. I hope it provides some insight, ideas to debate, and perhaps a few jumping-off points to something completely innovative and new that will serve our nation and provide a safer future.

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I. INTRODUCTION

A. PROBLEM STATEMENT

Intelligence sources from around the globe report that terrorist groups are developing the capability and the intention to deliver biological weapons of mass destruction. One report concludes that a biological attack is likely by the end of the year 2013 (Graham, Talent, Allison, Cleveland, & Rademaker, 2008). The purpose of this thesis is to examine ways to prevent the use of a biological weapon of mass destruction (WMD).

The health security policies of most governments, however, need to be transformed to adequately prepare for, and where possible, prevent, such an attack. The discussion in the next few chapters will identify critical dimensions of this transformation.

By far, the most important transformation step that governments can take is to establish urgently and aggressively a reorientation of their health security policies toward prevention of biological threats. Most governments' policies are reactive and slow, rendering the impact of a biological attack much more destructive.

Health security policies, however, need to work in a world with complex organizational and leadership designs. The nature of health risks requires coordinated actions across governments at various levels of jurisdiction, especially among international partners. Governments coordinate across various agencies, authorities, and disciplines. Finding ways to achieve this coordination in the prevention realm is the key to dramatically reducing both the possibility of a biological attack and minimizing its impact through fast, collective response.

B. BACKGROUND

The Weapons of Mass Destruction Commission *World at Risk Report* of December 2, 2008, on the "Prevention of WMD Proliferation and Terrorism" predicted that a WMD will be used "more likely than not" by the end of the year 2013. In August

2013, the United Nations was requested to investigate the alleged use of chemical weapons in Syria from an attack on Ghouta, near Damascus (Gardner, 2013). Surprisingly, the United States (U.S.) does not yet have a bold strategy to prevent the successful use of a biological weapon.

What the U.S. does have is the *2002 National Strategy to Combat Weapons of Mass Destruction* (White House, National Strategy to Combat Weapons of Mass Destruction, 2002). This strategy contains three pillars: counter proliferation, nonproliferation, and consequence management. It is written with the aim of threat reduction, not prevention. The strategy makes this clear in early discussion of counter-proliferation: "We know from experience that we cannot always be successful in preventing and containing the proliferation of WMD to hostile states and terrorists" (White House, 2002a).

This pillar of counter-proliferation addresses interdiction to combat movement of necessary elements such as weapon materials, expertise, and technology to build, manage, and deploy such a weapon under terrorist or hostile states' control. This is a critical step in prevention as the actions prepare the U.S. to counter or defeat the threat of an offensive, or intentional, use of a WMD.

The nonproliferation pillar of the strategy seeks to prevent terrorists and states from successfully obtaining WMD. This pillar identifies utilizing diplomatic approaches to dissuade activities that cooperate with efforts of proliferant states, such as slowing access to supplies being sold or available to proliferant states and additional efforts to end WMD and missile programs (White House, 2002b). These activities support prevention by seeking to limit production or access to a bioweapon; however, they do not prevent the successful use of a bioweapon.

The consequence management pillar addresses part of the U.S. defense response to the use of a WMD (White House, 2002c). These activities would occur in the time period after the use of a biological weapon.

1. Latency Time Period

Biological agents have a latency period (Barrett & Goure, 2008, p. 1). During this length of time between the deployment of a biological WMD and the natural biological response is an opportunity to prevent harm, and, in effect, provide an effective countermeasure to the weapon.

The challenge is that the deployed pathogen is not yet evident or active in this time period; the pathogen is virtually unseen during the latency period. Life sciences provide traditional biological surveillance tools for a natural pathogen. Epidemiology science provides a study of causes, distribution, and control of disease in populations. This information is presented in the diagnostic process of monitoring and identifying symptoms of a pathogen (UAB, Department of Epidemiology, 2005).

2. U.S. Biological Threat Approach "Right of Boom"

Strategies could possibly be employed to address manmade weapons of mass destruction, or an intentional release or dissemination of biological agents. However, a bold biological threat-prevention strategy is critically needed to address the threat of terrorist intentional release or dissemination of a bioweapon. If the need for creative approaches is urgent, then the United States must effectively deliver powerful resolutions to defend the U.S. homeland against the biological WMD threat. A key challenge to U.S. homeland security is that strategies of response and recovery are by default "right of boom" reactions to a biological incident that has already occurred. It is important to consider the "left of boom" biological threat-prevention possibilities because the power of prevention and threat reduction prior to an incident provide more opportunity to protect life and property than do activities after an incident. By limiting the strategic time period of focus to the period of response and recovery from a biological threat, the nation's leaders are missing a worthy and necessary target component: the actual strategic prevention of the offensive use of biological weapons. The prevention element of the health security policies of the U.S. Tribal Nations and the European Union's best practices could be beneficial to the U.S. This thesis will examine the intergovernmental

methods with the goal of identifying lessons that U.S. policymakers can utilize to strengthen the U.S. biological threat approach to support biodefense.

3. Strategic Pre-Incident Medical Intelligence Framework

Public health utilizes traditional medical intelligence techniques, such as bio-surveillance, to perform disease identification and containment. For the purpose of this thesis, medical intelligence is defined per the Department of Defense (DoD) and the U.S. military dictionary:

> The category of intelligence resulting from collection, evaluation, analysis, and interpretation of foreign medical, bio-scientific, and environmental information which is of interest to strategic planning and to military medical planning and operations for conservation of the fighting strength of friendly forces and the formation of assessments of foreign medical capabilities in both military and civilian sectors. (DoD, Joint Chiefs of Staff, 2002)

Traditional techniques operate with data elements from incident and post-incident time periods. Future potential prevention strategies will require pre-incident medical intelligence products accessible in the time period prior to when an offensive biological WMD is deployed. Yet, how will the precise prior time period be identified?

Strategic methods of medical intelligence that include fundamental pre-incident data elements are not yet fully developed. Because these types of tools are not yet identified and included in the biological threat approach strategies, less opportunity exists to focus on pre-incident prevention elements.

An innovative strategic medical intelligence framework could address the various challenges of transparent and timely information sharing. The framework should have the capacity to address various multi-jurisdictional culture and language barriers that delay decision-making; it should also work to achieve shared situational awareness (SSA). A strategic pre-incident medical intelligence framework could provide capability to determine potential at-risk populations in geographic areas and analyze potential at-risk disease hotspots prior to a disease outbreak in that specific area.

The medical intelligence needs of U.S. civil first responders are not addressed in the DoD policy definition of medical intelligence, which is used to address force protection. Yet civil force protection is part of the overall U.S. biodefense and response capacity for the homeland security discipline of emergency management and the nation's public health disease management system.

4. Time: A Non-Renewable Biodefense Resource

Medical intelligence that incorporates strategic products can support pre-incident decision making for both policy makers and operational leaders. This pre-incident strategic medical intelligence would allow for better use of the non-renewable resource of time. This time could then be allocated for use in strategic multi-jurisdictional decision making to deploy countermeasures (for example, in the case of vaccine deployment) as well as support necessary crisis decision making (such as when there are vaccine shortages during a novel disease outbreak). A strategic pre-incident medical intelligence framework would provide a platform for building future prevention methods for the United States to address the threat of a biological WMD.

5. Status Quo Biological Threat Political Paradigm

Leadership and governance play is a key role in the potential prevention of a biological WMD incident. While addressing the issue of confronting biological threats to the Homeland, former Secretary Michael Chertoff of the Department of Homeland Security said, "The challenge is to act decisively to minimize damage in an environment in which there will be imperfect information and potentially hundreds of thousands, if not millions, of lives lost" (Birdwell, 2011). Yet traditional leadership roles do not appear comprehensive enough for present day and future disasters (Birdwell, 2011). The type of leadership necessary for developing and leading innovative biological threat prevention strategies will need to be fully addressed.

C. RESEARCH QUESTION

What lessons from health security policies of intergovernmental coalitions of governments can policymakers apply to improve the U.S. approach to prevent the use of a biological WMD?

D. SIGNIFICANCE OF RESEARCH

1. Prevention of a Biological Weapon of Mass Destruction

The immediate users of the results of the present study will be the public health system (whose personnel serve as first responders in a potential biological WMD incident) and the nation's intelligence communities. The conclusions and recommendations offered can enhance the strategies currently operating within the medical intelligence system and present a biological WMD prevention method utilizing a strategic pre-incident medical intelligence framework in support of the U.S. Homeland Defense National Health Security Initiative.

2. Medical Intelligence in Support of Biodefense

Results of the present study also add to the emerging discussion about medical intelligence. They bridge the issue for support of biodefense and national security. The impact is multi-disciplinary and multi-jurisdictional in that medical intelligence is a contributing factor to many homeland security roles, such as law enforcement, transportation, military, public health, and other essential offices.

3. Literature

Results serve to fill a gap in the literature about prevention of a potential biological WMD and as a tool in addressing the unconventional threat of terrorism. Results identify future applications and research.

E. LITERATURE REVIEW

War created a need for medical intelligence. As early as World War II, the U.S. Army Medical Intelligence Office (under the Army Surgeon General) was identified as

responsible for production of Medical Intelligence for the DoD according to the National Center for Medical Intelligence (NCMI) (Bidwell, 1986).

Yet, global terrorism has changed the U.S. medical intelligence needs since September 11, 2001, in a fundamental way. Although there are earlier events than 2001, it was at the point that terrorism attacks targeted U.S. citizens on U.S. soil that the public health system role as a health and safety first responder shifted to include a civil defense role. However, from a larger scale event, the terrorist event of 9/11 placed our nation in a position to recognize a potential larger impact. Whether it was the emergency first responder role of public health to the experiences of 9/11 and the subsequent anthrax attacks of 2001, public health was now lifted to a position of necessary first responder. This role existed previously, but the role of public health in civil defense simply was visible in the new light of attacks on U.S. soil. Public health added the role of administering the key available prevention methods for a biological WMD incident. Additionally, public health continues to lead the Emergency Support Function (ESF) 8 Public Health and Medical Duties and responsibilities for an intentional bioterrorism incident (Department of Health and Human Services [DHHS], 2008). This new civil defense role has created confusion and operational stress in the current public health system (Siegrist, 1999).

The scope of the literature reviewed includes publications such as journals, books, government documents, and popular media. The literature is organized into six categories: biological weapons of mass destruction emerging threat risk; history of medical intelligence and product requirements; medical intelligence; countermeasures in the public health system; intergovernmental models that impact support to biodefense; and treaty rights, sovereignty and trust responsibility**.**

1. Emerging Threat Assessment and Vulnerability of a Biological Attack

Literature contains extensive discussion regarding threat assessment and vulnerability to a biological attack (Rhodes & Danado, 2007). Controversy exists over the significance of a biological threat, as what is considered a “successful” biological terrorist incident has not been determined. Additionally, disagreement exists in the

literature as to what is necessary to determine that the biological WMD threat is identified as a risk and to what degree the current risk status would measure the threat (Rhodes & Danado, 2007). Literature sources include federal government, military, and private sector research and development areas. The military and academic sectors provide the most succinct documents.

Biological weapons are more destructive than chemical weapons, including nerve gas (Siegrist, 1999). The effects of a nuclear release or a biological weapons' release is demonstrated in the anticipated casualties from a 10 kiloton nuclear release when compared to an intentional release of 10 kg of viable anthrax as a biological weapon (Siegrist, 1999).

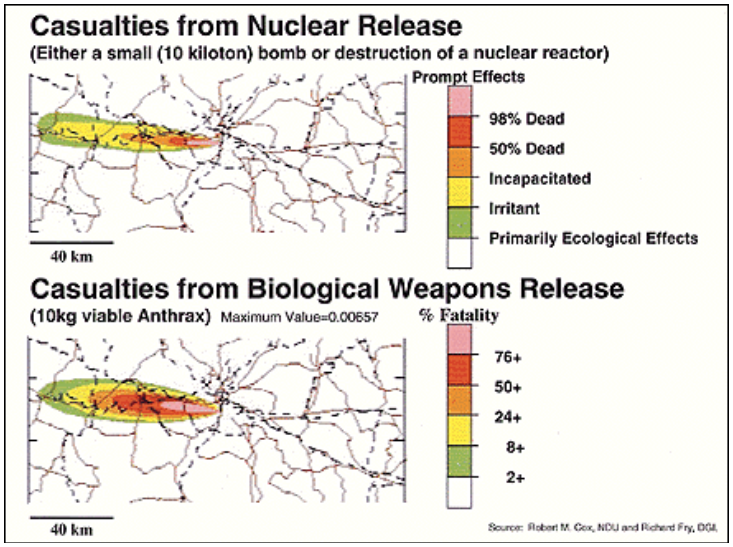

Figure 1. Effects of a Nuclear and Biological Weapons Release (From Siegrist, 1999).

Figure 1 shows that each biological weapon release has an impact relevant to the potential impact to environment or causalities depending on the geographical location of life in relationship to the actual release. A conversion table confirms that 10 kg of weight converts to approximately 22.0462 pounds. In perspective, this comparison estimates devastation from a biological weapon release of an amount of viable anthrax that weighs less than a 25 lb. bag of dog food.

The fast pace of current life sciences technology developments alters the future biological threat by providing potential access to aspects of biological weapons that have previously been less available for potential use by rogue terrorists (Rhodes & Dando, 2007). The Committee on Advances in Technology and the Prevention of their Application to Next Generation Biowarfare Threats has identified that focusing on the known aspects of potential biowarfare is too narrow a view. Catherine Rhodes and Malcolm Dando identified in early 2006 that this committee highlighted that the unknowns of future biowarfare would need to be addressed by thinking differently about the future biological threat (Rhodes & Dando, 2007).

2. History and Description of U.S. Medical Intelligence

The concept of medical intelligence being applied to civil force protection in support of additional military force protection represents a gap in the literature, yet the civilian population continues to be a terrorist target. The literature addressing the description and history of medical intelligence is broad and has been available for several decades. Most of the data regarding U.S. medical intelligence is provided by one sector of the federal government and the military: the U.S. Army Medical intelligence office, operated under the Army Surgeon General. Medical intelligence has also been produced for the DoD. Most of the medical intelligence content available typically addresses military force protection. Much of the approach to medical intelligence today is traditional in its focus on disease surveillance and medical intelligence strategies that the medical intelligence office produced when the U.S. Army Medical Intelligence Office was founded under the Army Surgeon General with WW II (Bidwell, 1986). Another gap identified in the literature is how medical intelligence applies to the public health system.

3. Medical Intelligence Product Requirements and Foreign Focus

The literature in the category of medical intelligence products are not yet fully developed to meet current public health and civil defense needs. Technology is advancing at a rapid pace, increasing the current medical intelligence needs. The literature regarding medical intelligence technology and its application to public health contains gaps. The category of medical intelligence products in general is unbalanced and incomplete.

The NCMI produces a wide variety of medical intelligence assessments based on customer requirements. Per NCMI, major medical intelligence product groups range from infectious disease alerts assessing the risk to U.S. forces from foreign disease outbreaks to assessing health risks associated from exposure in industrial facilities (Clapper, 2009). The general focus of the literature is on the biological threat to U.S. forces of an application of a foreign biological threat outside the domestic U.S. homeland. The literature contains a gap when it comes to addressing medical intelligence products to support the role of public health in civil defense of the potential use of a biological weapon within the United States.

4. U.S. Medical Intelligence and Countermeasures in the Public Health System

A significant gap in the literature and research around the concept of medical intelligence exists as it relates to the current status of the risk of a biological WMD incident. Medical intelligence appears to be struggling to keep up with the pace of advancements as they potentially apply to bioterrorism (Arredondo, 1983). Certainly, as the topic is applied to the public health system, more research is necessary. The concept of medical intelligence and how it relates to the potential capacity to access countermeasures, such as vaccine deployment in response to a biological WMD incident, is necessary.

Vaccine appears to be the key medical countermeasure available. Literature on the topic of vaccines is robust, and the science of vaccine issues well studied over many decades (Goodman, 2007). The literature includes a segment of immunization data and use of vaccine as a countermeasure to the biological threat. A challenge of immunizations as a countermeasure includes various vaccine requirements of repeated dosing to achieve adequate protection. The implications of lengthy research, testing, and U.S. Food and Drug Administration (FDA) processes for approval of vaccines is an area of controversy with ongoing debate to include issues such as vaccine safety, effectiveness, and possible side effects (FD&C Act Chapter V Sec. 505:355, 2010). There is a gap in the literature as to where the countermeasures in the public health system, such as vaccine and immunizations, interconnect to medical intelligence.

Response activities such as deployment of vaccine and placement capacity of sufficient numbers of medical professionals to perform immunizations are current challenges in the public health system during a routine and slow-moving natural disease. It is anticipated these challenges would be heightened during an intentional bioterrorist attack.

Real time deployment response needs as applied to civil defense and the data surrounding geographical disease movement as applied to prevention strategies potentially utilized by public health and response decision-making are currently disconnected. The limited access to current U.S. medical intelligence for the public health system creates vulnerability in supporting civil biodefense capacity. Vulnerabilities include medical countermeasure deployment that is not timely in response. As a result, potential vaccine and prophylaxis measures may arrive after a deadly spread of disease and tip a population into impossible disease containment scenarios (Goodman, 2007).

The characteristics of biological weapons lend themselves toward pre-exposure vaccine deployment and necessary mass immunization countermeasure strategies (Goodman, 2007). The harmful effects of biological weapons displayed after their release (Cole, 2007). This factor makes the biological threat a weapon of stealth. The bioagent danger is in both the intangible aspect of the initial exposure and the time delay of the harmful effects, which may be revealed too late to perform an effective application of a medical countermeasure.

5. Treaty Rights, Sovereignty and Trust Responsibility

The literature on key tribal issues such as treaty rights, trust responsibility, and sovereignty, is both useful and plentiful. The U.S. Constitution states that all Treaties made with Indian tribes are considered the supreme law of the land:

> This Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding. (U.S. Constitution, Article VI, Clause 2: Supremacy Clause)

This is relevant to U.S. Homeland Security and National Security interests in the area of jurisdiction of various authorities and responsibilities regarding the U.S. Homeland. Yet the government processes, expectations, and interpretations of the implementation of leadership roles and governance of U.S. Tribal Nations and the U.S. federal, state and local governments vary in cultural awareness and understanding.

The U.S. Tribal Nations currently report challenges with implementing and integrating current homeland security directives, which were highlighted in the recent H1N1 global pandemic influenza outbreak and the initial processing of priority populations driven by initial medical countermeasure, vaccine, shortages. As identified in the Homeland Security Fact Sheet of the National Congress of American Indians (NCAI),

> In the Homeland Security Act of 2002, tribal governments are included in the definition of "local governments" or political subdivisions of the states. In contrast, tribal governments are recognized as separate sovereigns under the United States Constitution that do not derive their sovereign status from the States, and accordingly, the federal should continue to reflect the legal distinction between local and governments that are political subdivisions of the states and tribal governments. (Congressional Record, Vol. 149, No. 37, 2003)

Past agreements and historical treaties, as well as current opportunities to address American Indian/Alaska Native (AI/AN) health disparities impact the manner in which the U.S. Tribal Nations intergovernmental information sharing is performed. Tribes in the United States must interact on a daily basis with various levels of intergovernmental relationships to perform tribal governance. The experiences of U.S. tribal communities may provide insights to the needs of effective intergovernmental relationships.

6. Conclusion

One element indicated in literature as prevention for a biological WMD is pre-exposure vaccine delivery and immunizations as a countermeasure. The literature is incomplete and unbalanced concerning the topic of alternative methods of bioweapon prevention. Yet the issue of the medical countermeasure of vaccines and immunizations remains full of controversy concerning the implementation of vaccine delivery.

Literature and research contain a significant gap around the concept of medical intelligence as it relates to the current status of risk of a biological WMD incident. Medical intelligence appears to be struggling to keep up with the pace of advancements that potentially apply to bioterrorism. Certainly, as the topic is applied to the public health system, more research is necessary. The concept of medical intelligence and how it relates to the potential capacity to access countermeasures, such as vaccine deployments utilized toward a biological WMD incident, is necessary. However, the actual framework needed for application of medical intelligence in the public health system does not appear to be clearly developed.

The themes in the literature describing (a) the history of medical intelligence, (b) the relevant threat assessment of a biological attack, (c) what type of medical intelligence products exist, and (d) what the current countermeasures are in the public health system—significantly, vaccine and immunization—indicate uncertain responsibilities assigned to the current public health system. Review of literature reveals that the significant prevention method identified for a biological WMD incident has been applied countermeasures of vaccine and immunizations. Vaccine and immunizations are deployed via the public health system. Yet a search of available literature failed to show how medical intelligence and the public health systems connect in counterterrorism efforts in national and homeland security efforts.

F. METHOD

1. Research Investigation Motivations

Overall, the purpose of this research was to identify what lessons from health security policies of intergovernmental coalitions of governments' policymakers could apply to improve the U.S. approach to prevent the use of a biological WMD. The U.S. appears to lack a strategy and plans to prevent the use of a biological WMD. This may indicate a belief that prevention is not possible. It is therefore important to investigate if other coalitions of governments have the same premise or, alternatively, if they have strategies and plans to reduce such a threat. Exploratory research was performed of

coalitions of governments' transnational health security policies. This study involved six questions:

a. Question 1

Do coalitions of governments have a stated biological threat approach with intended actions (IA) for prevention of an offensive use of a biological weapon of mass destruction? The initial step was to identify if coalitions of governments that have transnational-type health security policies expect that prevention of a biological threat from intentional terrorist use is possible. Policy analysis was performed to assess if current health security policy identified prevention as a policy element and, if so, incorporated strategic biological threat prevention.

b. Question 2

What are the similarities and differences of the stated intended actions of the biological threat approaches of the coalitions of governments for the time period of prevention? Examples of global and national health security biological threat prevention policy were identified. The health security policies of the areas identified in the sample were used to study possible biological threat prevention strategies.

c. Question 3

What are the biological threat actual actions (AA) of the sample of coalitions of governments biological threat approach reported for the time period of prevention of a global biological threat incident? This step examined if coalitions of governments that have transnational-type health security policies performed actions during an actual biological threat. Analysis was performed to assess if during the H1N1 global pandemic of 2009–2010, the coalitions of governments identified prevention as a reported performance focus and, if so, incorporated strategic biological threat prevention actions.

d. Question 4

What are the similarities and differences of the stated actual actions of the biological threat approaches of the coalitions of governments for the time period of prevention? A comparative study was performed using intergovernmental examples of the reported actual actions for time period of prevention within the sample's after-action and lessons-learned reports from the H1N1 pandemic influenza 2009–2010.

e. Question 5

How do the stated intended action indicators compare to the reported actual action indicators of the biological threat approaches of the coalition of governments for the time period of prevention? A time period analysis of the H1N1 global pandemic influenza 2009–2010 biological threat incident was used to examine decisions and actual actions of lessons learned.

f. Question 6

What recommendations can be made to improve U.S. biological threat prevention? Lessons learned were identified and strategic recommendations proposed for furthering possible prevention methods to develop a framework for medical intelligence to support biodefense.

2. Data Sample

Intergovernmental examples of transnational biological threat approaches were examined and studied. The European Union was selected because of its nation-to-nation role with its member states. The U.S. Tribal Nations were selected because of their government-to-government role with the United States.[1] The Global Health Security Initiative and the United States were selected for inclusion in the study so as to give

[1] Although not technically an official coalition entity by corporate structure, the tribal nations of the United States operate in a system of coalition to accomplish and approach tribe-to-tribe, as well as nation-to-nation governance systems and structure with the United States government. Therefore, for the purposes of this study, tribal nations are identified as a coalition of governments and titled U.S. Tribal Nations in the sample.

comparison context to the placement of the EU and U.S. Tribal Nations within global and national health security policy initiatives. The thesis examines the nation-to-nation or government-to-government biological threat approach identified within health security policy in relationship to biological threat leadership decision making of reported actions of the same sample for a global infectious disease outbreak. The data collection, analysis, and interpretation of research findings were examined and investigated to draw inferences concerning causal relationships among the health security policy elements and infectious disease outbreak decision-making variables.

3. Data Collection

The data was collected from academic literature and abstracts, books, media sources, informational interviews, policy reviews, and documents such as government policy documents, laws, treaties, presidential directives, national strategies, emergency plans, memorandums, meeting minutes, H1N1 pandemic assessments, after-action report conclusions compiling strategic health security and national security policy. Overall, the analysis continually informed the data collection and the data collection continually informed the analysis.

A study of transnational policy was conducted of global and national health security policies. The national health security policies were reviewed and assessed to identify and compare the biological threat approaches of the United States, the European Union, the U.S. Tribal Nations, and the global health security partnership of the Global Health Security Initiative (GHSI).

II. HEALTH SECURITY PREVENTION OF BIOLOGICAL WEAPON OF MASS DESTRUCTION

Question 1 (Q1): Do coalitions of governments have a stated biological threat approach identified of intended actions for prevention of an offensive use of a biological weapon of mass destruction?

A. Q1 METHOD

1. Step 1a

A sample of four coalitions of governments was selected. The four specific areas have the potential to have developed transnational health security policies. For the purposes of this study, the assumptions are that each government has identified responsibilities of self-interest. In that context, nations identified governing in a structure of a coalition of governments were considered. The coalitions of governments were selected to provide an opportunity to examine separate governance entities required to govern self-interests, yet voluntarily working together in cooperative purpose or joint action. The sample coalitions have opportunity to have considered or developed transnational health security policies to govern intended actions of biological threat prevention within a transnational health security goal. The health security policies provided a source of potential biological threat prevention strategies for further examination.

Additionally**,** the coalitions of governments were selected because each had numerous opportunities and requirements to perform transnational health security policy development and actual actions of implementation of those health security policies with specific potential transnational impact to the area of biological threat prevention strategies and methods. The study of the biological threat-prevention strategies provides insight to biological threat prevention strategies that impact U.S. national security addressing the future prevention of the offensive use of a biological weapon of mass destruction.

Based upon the nature of the government-to-government relationship requirements, as well as the nation-to-nation responsibilities of each of the areas of the sample, the following four coalitions of governments A–D are the sample:

a. Global Health Security Initiative (GHSI)

Global Health Security Initiative is a voluntary partnership of nine member states made up of governments to address the mission of health security. GHSI members include Canada, France, Germany, Italy, Japan, Mexico, the United Kingdom, the United States, and the European Commission of the European Union. The World Health Organization is a technical advisor.

b. European Union (EU)

The European Union (EU) consists of 27 member states (nations).

c. United States (U.S.)

The United States consists of federal, state, local, and tribal governments consisting of 50 states and more than 500 federally recognized U.S. Tribal Nations.

d. U.S. Tribal Nations

U.S. tribes considered "domestic dependent nations" under the U.S. Constitution of the U.S. federal government consist of over 500 federally recognized U.S. tribes.

2. Step 1b

For each coalition of governments in the sample, documents that addressed the representing health security policies were gathered and examined for possible identification of the representative biological threat prevention approach for each area of the sample.

The stated actions that each coalition of governments in the sample intended to take for a biological threat were identified as intended action in the difference calculation. The intended actions identified were coded into one or more of five categories: (1) health

security policy, (2) legal authority, (3) governance organizational structure, (4) key advisors, and (5) leadership organization. The stated intended actions of the various biological threat approaches were identified from the sample of coalitions of governments stated intended actions represented in their respective health security policies.

A review of transnational health security polices was conducted of the sample to identify stated policy language and notate the nation's biological threat prevention methods for further examination. The prevention strategy for each nation or coalition of governments was not documented in each of the nation's health security policy in a similar manner. The larger snapshot of the nation's biological threat *approach* was identified in order to access the possible biological threat prevention methods for review. This larger framework was identified within the health security policies by a review of the stated language addressing a biological threat.

The noted methods and issues were then coded and later counted as a category that was found characteristic within the sample of coalitions of governments' larger biological threat approach framework. Together the elements of biological threat prevention inherent within the larger biological threat approach represented the preventative framework that the coalition of governments demonstrated in the health security policies. For the purposes of this study, the stated intended actions identified are the preventative framework of the representative leadership for use in decisions for biological threat prevention. The stated intended actions were examined to determine if there was an intention by the governing nations in the representative sample to ultimately take preventative action against a biological threat or potential terrorist use of an offensive biological WMD. Each intended action was coded with one of five categories identified. The health security policy biological threat approach intended actions indicators identified to category types 1–5 include the following:

1. Health security policy
2. Legal authority
3. Governance organizational structure
4. Key advisors

5. Health security policy goals (priorities, objectives, strategies).

B. Q1 ANALYSIS

Sample areas A–D health security policy stated indicators of intended actions.

- **1a:** The sample of coalitions of government each had identifiable indicators that demonstrated a biological threat prevention approach.
- **1b:** Indicators of the biological threat prevention approaches were identified from the health security policies of the coalitions of governments. The stated intended actions identified in the biological threat approaches were then sorted into categories.

The health security policies of the coalitions of governments were examined for indicators of intended actions which are represented in the Table 1.

Table 1. Health Security Policy Biological Threat Approach Indicator Intended Actions Results

Health Secuirity Policy (HSP) Biological Threat Approach (BTA) Indicators Results Areas A-D	
"Intended Actions"	
Coalations of Governments Sample Areas A-D	**Indicators of Biological Threat Approach in Stated Health Security Policy (HSP)**
Indicators of Biological Threat Approach Categories 1 - 5	1. Health Secutity Policy 2. HSP Leagal Authority 3. HSP Governance Organizational Structure 4. HSP Key Advisors 5. HSP BTA Policy Goals, Priorities, Objectives, Strategies
A. Global Health Secuirity Initiative	HSP Biological Threat Approach Indicators = 22
B. The European Union	HSP Biological Threat Approach Indicators = 27
C. The United States	HSP Biological Threat Approach Indicators = 56
D. U.S. Tribal Nations	HSP Biological Threat Approach Indicators = 44

- A. GHSI health security policy examination identified 22 indicators of intended actions within the five categories.
- B. EU health security policy examination identified 27 indicators of intended actions within the five categories.
- C. U.S. health security policy examination identified 56 indicators of intended actions within the five categories.
- D. U.S. Tribal Nations' health security policy examination identified 44 indicators of intended actions within the five categories.

C. Q1 KEY FINDINGS

1. Key Findings

- Each of the sample areas A–D evidenced an intention to prevent a biological threat in its respective stated health security policies. Indicators of intended actions addressing a health security biological threat were found from stated in the health security policy language of the sample of four coalitions of governments to include the Global Health Security Initiative, the European Union, the United States and U.S. Tribal Nations. These indicators of the biological threat prevention approaches of the sample were identified by indicators sorted to five key categories: (1) health security policy, (2) legal authority, (3) governance, (4) key advisors, and (5) policy goals (priorities, objectives, strategies).

- The collective of the indicators sorted into the five categories for each of the coalitions of governments in the sample were then identified as the biological threat approaches utilized for further examination for this study.

- The United States held the highest score in the number of coded indicators of *intended actions* in the identified biological threat approaches of the four areas of the sample. This result may appear to counter the premise that the U.S. lacks prevention activities; however, an evaluation was not performed as to the activities themselves, rather an examination of indicators of the activities in both stated intended actions and reported lessons learned actual actions. One of the values in the indicators were collaborative partners and the examination of the U.S. health security policies revealed additional stated partners which was one reason that increased the indicators of a U.S. biological threat approach. The European Union and the U.S. Tribal Nations, respectively, held the next highest indicators intended actions scores.

The biological threat approaches identified in the study of Question 1 were used in the next steps of the study to further examine biological threat prevention methods.

2. Patterns and Trends

The health security policies do have various stated intentions that combine addressing a natural biological threat or a manmade biological threat. However, the health security policies of the sample were not found to have a specific biological threat policy identified as "biological threat prevention."

The representing nations within the sample of the coalitions of governments do not use the same language to address prevention of a biological threat in the respective health security policies. The policies do not have a similar or specified area for defensive biological threat policies for potential terrorist use of biological weapon of mass destruction. For example, the Global Health Security Initiative ministerial statements Belgium, December 2008 state, "Strengthening Global Health Security. The GHSI will continue to make a concerted effort to share best practices in borders management for the purposes of health security, assess the effectiveness of chosen approaches and technologies, as well as to align strategies, where appropriate" (GHSI, 2008). The GHSI further states their health security mandate as follows:

> The mandate of the GHSI is to undertake concerted global action to strengthen public health preparedness and response to the threat of international CBRN terrorism. In 2002, pandemic influenza preparedness and response was included in the mandate, given the linkages to health security. Lessons learned from a range of incidents, including both intentional and naturally-occurring events, inform work undertaken in support of this mandate. (GHSI, 2001, p. 2).

In comparison, the United States health security language states more of an all hazard approach in the language. For example, "The National Health Security Strategy (NHSS) is the first comprehensive strategy focusing specifically on the Nation's goals of protecting people's health in the case of an emergency. The purpose of the NHSS is to guide the Nation's efforts to minimize the risks associated with a wide range of potential large-scale incidents that put the health and well-being of the Nation's people at risk,

whether at home, in the workplace, or in any other setting. In this context, national health security is achieved when the Nation and its people are prepared for, protected from, respond effectively to, and able to recover from incidents with potentially negative health consequences" (U.S. National Health Security Strategy of the United States of America, 2009).

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III. HEALTH SECURITY POLICY BIOLOGICAL THREAT PREVENTION TRANSNATIONAL COMPARISON

Question 2 (Q2): How is the time period of prevention of the stated intended actions similar or different between the biological threat approaches of the coalitions of governments?

A. Q2 METHOD

1. Step 2a

The sample areas A–D biological threat approaches identified in Q1 were utilized for Q2 and sorted into time periods to identify the stated intended actions of the time period of prevention. To do this, the criterion for the term *prevention* was developed and labeled to further study biological threat prevention as it applies to the specific biological threat approach of the sample's coalitions of governments. Next, the criteria for the time period of biological threat prevention were labeled and the criteria for the four stages of emergency management were developed and labeled. Finally, the sample's identified biological threat approach indicators were sorted into four time periods.

To identify indicators of prevention within the biological threat approaches of the sample, the differences of the biological threat approaches were sorted, coded, and categorized by time periods. The data was coded into one or more four types of time periods that were then labeled "time tiers" as described in Table 2. The indicators which were sorted, coded, categorized, and identified by time periods and activity period of prevention were then examined. To further study of the prevention scope of the larger biological threat approach, differences of the coalitions of governments' intended actions were compared for the time period of prevention of terrorist use of a biological WMD within the sample's stated biological threat approach. The biological threat approaches of the coalitions of governments were then identified by the time period of prevention. The stated intended actions were coded into one or more of four time categories with the following criteria:

a. Time Tier 0 (TT0)

Time Tier 0 (TT0) is the time period of a pre-incident prevention measure that occurs prior to an incident or event. Criterion for indicator assumption is that the biological threat can be prevented and the intended action or actual action is to stop or counter the biological threat. The prevention action indicator criterion is to anticipate and act in advance of a biological threat incident so as to forestall, avert, hinder, counter, thwart, or stop the biological threat occurrence.

b. Time Tier 1 (TT1)

Time Tier 1 (TT1) is the time period of a pre-incident preparedness measure that occurs prior to an incident or event. Criterion for the action indicator assumption is that the biological threat will occur and the intended action or actual action is to prepare for the biological threat. The preparedness action indicator criterion is to place in a position or condition of a state of readiness for the biological threat occurrence.

c. Time Tier 2 (TT2)

Time Tier 2 (TT2) is the time period of an incident or event response measure. Criterion for the action indicator assumption is that the biological threat is occurring and the intended action or actual action is in response to the biological threat. The response action indicator criterion is to answer, in words or action, to the biological threat occurrence.

d. Time Tier 3 (TT3)

Time Tier 3 (TT3) is the time period of a post-incident recovery measure. Criterion for the action indicator assumption is that the biological threat has occurred and the intended action or actual action is in recovery to the biological threat. The response action indicator criterion is to take action to regain, restore, or return to any former or better state or condition such as existed prior to the biological threat occurrence.

2. Step 2b

Tallies for each time period were computed and comparisons were drawn between the coalitions of governments.

B. Q2 ANALYSIS

Sample areas A–D biological threat approaches of coalitions of governments stated intended actions of prevention.

- 2a: Each coalition of governments had identifiable stated intended actions specific to prevention within its biological threat approaches identified from the respective health security policies.
- 2b: The stated intended actions of the biological threat prevention approaches were identified from the coalition of governments' health security policies sorted into categories by the indicators and into time periods of prevention, preparedness, response, and recovery. The indicators for the time period of prevention were separated for examination. The time period of prevention results for the sample:
    - A. GHSI health security policy examination identified 16 biological threat prevention stated intended actions representing 72.72% of its health security policy identified goal.
    - B. EU health security policy examination identified 27 biological threat prevention stated intended actions representing 100% of its health security policy identified goal.
    - C. U.S. health security policy examination identified 36 biological threat prevention stated intended actions representing 64.28% of its health security policy identified goal.
    - D. U.S. Tribal Nations health security policy examination identified 39 biological threat prevention stated intended actions representing 88.64% of its health security policy identified goal.
- 2c.The calculation method below was used to identify the percentages for the sample. The sample indicators are counted across time periods. Because an area in the sample may have elected to utilize the indicator in more than one time period, the periods of time tiers 0–3 can potentially sum more than 100%.

Table 2. Health Security Policy Biological Threat Approach Indicator Intended Actions Results Time Periods TT0–TT3

Health Security Policy (HSP) Biological Threat Approach (BTA) Indicators by Time Tiers					
"Intended Actions"					
Coalitions of Governments Sample Areas A-D		Time Period	Time Period	Time Period	Time Period
Timeframe Purpose Assumptions Time Periods of Time Tier 0 - Time Tier 3		Time Tier 0 (TT0) Stop or Counter Biological Threat	Time Tier 1 (TT1) Biological Threat Will Occur	Time Tier 2 (TT2) Biological Threat is Occuring	Time Tier 3 (TT3) Biological Threat Has Occurred
Time Period Criteria Time Periods of Time Tier 0 - Time Tier 3		Pre-incident Prevention Measure Occurs in Time Period Before Incident	Pre-incident Preparedness Measure Occurs in Time Period Before Incident	Incident Response Measure Occurs in Time Period at an Incident	Post-incident Recovery Measure Occurs in Time Period after Incident
Homeland Defense and Security and/or Emergency Management Activities of Time Tier 0 - Time Tier 3	Total indicators of Biological Threat Approach in reported lessons learned and after action reports for Health Security Policy Categories 1-5:	Prevention	Preparedness	Response	Recovery
Health Security Policy Categories 1 - 5 Activity Criteria	*1. Health Security Policy 2. HSP Legal Authority 3. HSP Governance Organizational Structure 4. HSP Key Advisors 5. HSP Goals, Priorities, Objectives, Strategies*	To anticipate and act in advance of a biological threat incident so as to forestall, avert, hinder, counter, thwart or stop biological threat occuremce	To place in position or condition of a state of readiness for the biological threat occurrence	To answer, in words or action, to a biological threat incident occurrence	To take action to regain, restore, or return to any former and/or better state or condition such as existing prior to a biological threat occurrence
A. Global Health Secuirity Initiative	HSP Biological Threat Approach Lessons Learned Indicators = 22	TT0 = 16	TT1 = 20	TT2 = 22	TT3 = 16
Total %		72.72%	90.90%	100.00%	72.72%
B. The European Union	HSP Biological Threat Approach Lessons Learned Indicators = 27	TT0 = 27	TT1 = 24	TT2 = 23	TT3 = 23
Total %		100.00%	88.88%	85.16%	85.16%
C. The United States	HSP Biological Threat Approach Lessons Learned Indicators = 56	TT0 = 36	TT1 = 55	TT2 = 56	TT3 = 56
Total %		64.29%	98.21%	100.00%	100.00%
D. U.S. Tribal Nations	HSP Biological Threat Approach Lessons Learned Indicators = 44	TT0 = 39	TT1 = 40	TT2 = 44	TT3 = 44
Total %		88.64%	90.91%	100.00%	100.00%

$$\frac{Part}{Whole} \; X \; 100 = P$$

$$(Part)\ TTO\ BTA\ INDICATORS \quad \frac{16}{22} = 0.\overline{72}\ X\ 100 = 72.72\%\ (P)$$
$$(Whole)\ Sample\ Area\ A\ BTA\ Indicators$$

Figure 2. Calculation of Indicators' Percentages

The total number of biological threat approach (BTA) indicators in Figure 2 is 16 for the biological threat approach indicators that were either stated in health security policies of the sample or reported to specific time periods by the sample's after-action

and lessons-learned reports for the sample and used as a baseline number that was equivalent to 100%, thus, 16 =100%. This number was divided by the BTA indicators for given time periods. (The example in Figure 2 is 22, which is the total of the overall biological threat approach indicators.) The result of the division (0.7272) was converted to a percentage by multiplying it by 100, thus giving a final percentage of 72.72%.

C. Q2 FINDINGS

1. Key Findings

- Prevention of a biological threat is a key stated health security policy element for each coalition of government. More than 50% of the intended actions stated in the health security policy biological threat approach are stated in the period of prevention (TT0).Yet the time period with the largest number of stated intended action indicators scored for the sample of the coalitions of governments of stated health security policy were identified in the time period of response (TT2). Areas A, C, and D each ranked their highest scores in the A: 22 and C: 56 and D: 44 category of the time period of response (TT2). The subtotal, 122 of the 149 biological threat approach elements identified represent 81.88% of the total examined elements score to the response category of intended actions. The second highest score ranking of the coalitions of governments stated intended actions of the represented health security policy biological threat approach was identified in the time period of preparedness (TT1) for all of the sample areas A–D.
- An exception was identified in the results identified to the area (B), European Union. The European Union scored the highest (B: 27) in the time period of prevention (TT0) category.
- Comparison of the sample within the time period of prevention reveals the second highest score ranking was the area (D), U.S. Tribal Nations (D: 39).

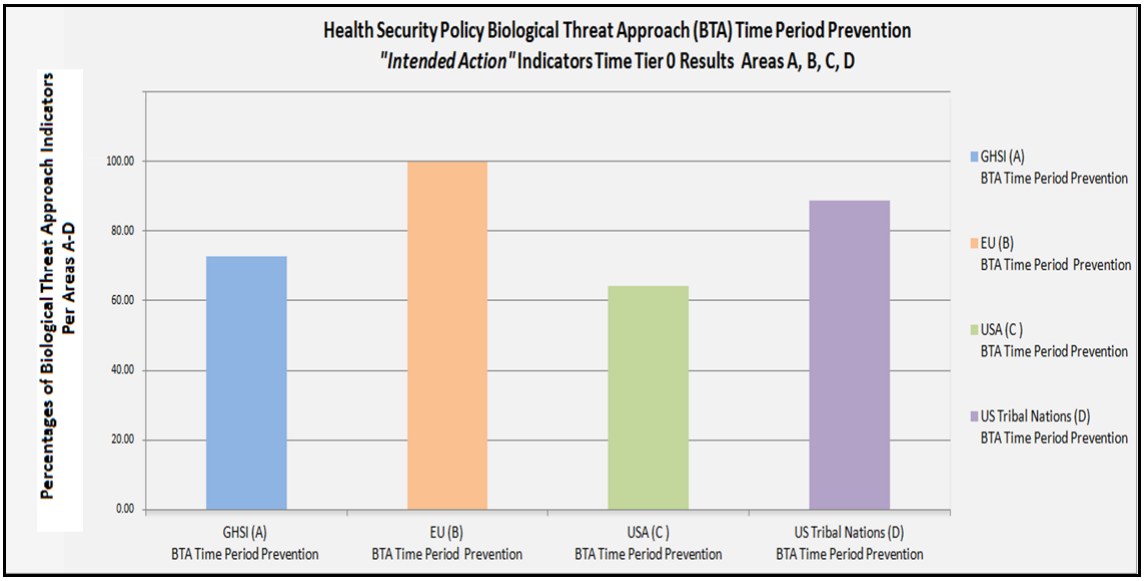

Figure 3. Health Security Policy Biological Threat Approach Indicators of Intended Actions by Time Period Prevention TT0 Results Areas A–D

2. Patterns and Trends

The health security policy study of the biological threat approach of areas A–D of the Global Health Security Initiative, the European Union, the United States, and U.S. Tribal Nations identify three similar patterns in the findings for the action phase areas of preparedness, and response, and recovery. These action phases are found in the time periods for time tiers 1–3. However, a difference in the areas of A–D in the action area of prevention is found in the time period of TT0.

While each of the areas A, B, and D were found to be higher in the prevention action phase in the time period of TT0, a trend was found in two of the areas. Specifically, the area (B), European Union, and area (D), U.S. Tribal Nations, were found to have a higher propensity toward the action phase of prevention that is found in the time period of TT0. Figure 3 reflects areas B and D which trend differently in the prevention action phase and time period of TT0 in the graph in Figure 4:

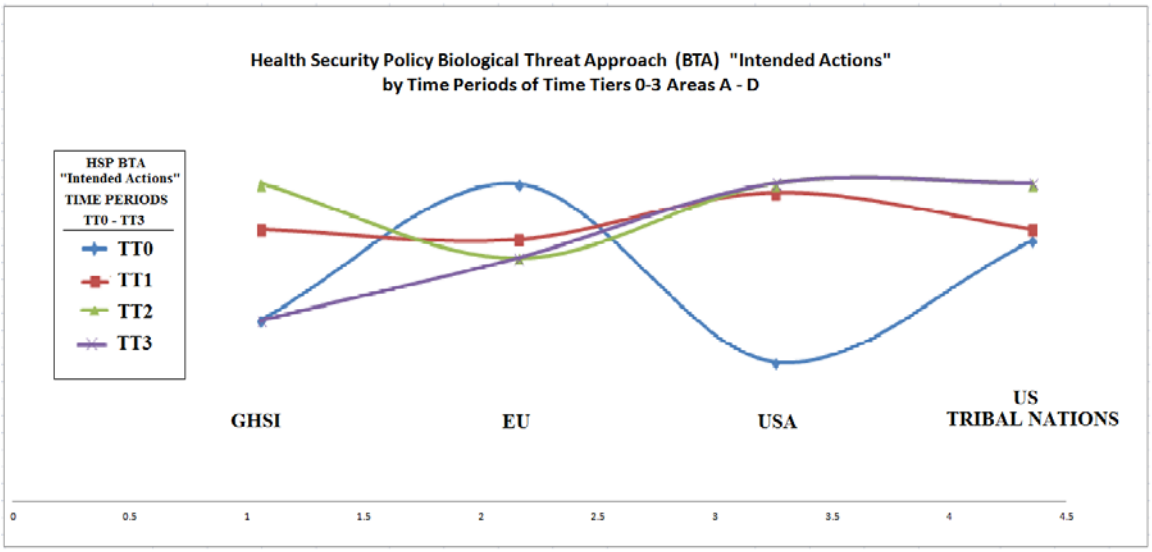

Figure 4. Health Security Policy Biological Threat Approach Intended Actions by Time Periods of Time Tiers 0–3 Areas A–D

The chart of graphs below depicts the comparison of the time periods of action phases for the indicators of intended actions identified in the biological threat approaches for the sample areas A–D. Figure 5 indicates a comparison of the sample area's indicators of the intended actions in each time period to that same sample area's own possible 100% factor of the same area's biological threat approach. That is, if the indicators in that time period of the same sample area were 100%, the percentage would appear on the graph versus what percentage the indicators are stated in the health security policy by time periods. Figure 5 reflects a comparison of the biological threat approaches by time periods each to the other areas of the sample.

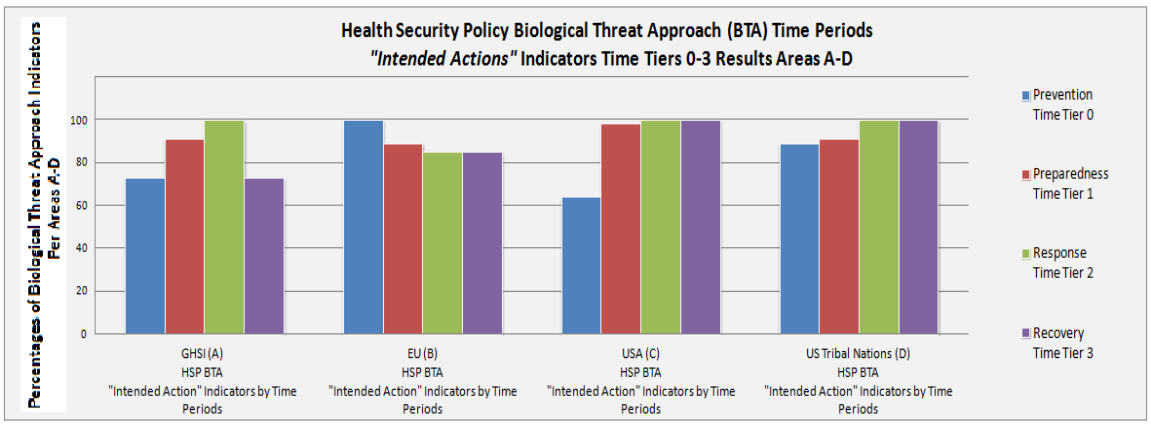

Figure 5. Health Security Policy Time Tiers 0–3 Biological Threat Approach Indicators "*Intended Actions*" Results

The pattern of overall propensity identified in the health security policy intended action indicators to the time period of prevention in two of the areas is the basis of the focus the following examinations in the study of area (B), the European Union, and Area (D), U.S. Tribal Nations. The model of intergovernmental leadership for the coalitions of governments in the areas (B) the European Union, and (D), U.S. Tribal Nations, appears to be leading these two specific areas of the sample in the direction of prevention to address a biological threat.

The sample area (D), U.S. Tribal Nations, appears to be leading in a stronger propensity toward the time period of prevention over the area (C), the United States, yet the U.S. is identified as a key advising governing and regulatory body to the U.S. Tribal Nations in a biological threat incident or event.

IV. H1N1 GLOBAL PANDEMIC BIOLOGICAL THREAT PREVENTION ACTIONS

Question 3 (Q3): What are the biological threat actual actions of the sample of coalitions of governments biological threat approach reported for the time period of prevention of a global biological threat incident?

A. Q3 METHOD

1. Step 3a

After-action documents from the global biological threat of the H1N1 pandemic influenza of 2009–2010 were gathered.

2. Step 3b

The sample areas A–D biological threat approach actual-action indicators were identified and coded into one or more of five categories. A biological threat incident event was identified which impacted the entire sample of areas A–D in order to study the time period of prevention within the biological threat approaches of the reported actual action indicators of the sample of coalitions of governments. The actual action indicators for the identified global infectious biological incident reported by the sample were examined for potential trends and patterns by time periods. The global H1N1 pandemic influenza of 2009–2010 was selected as the biological threat incident identified for the study of the samples' reported actual action indicators representing a global transnational biological threat. The reported actual actions were examined to determine if there was an identifiable focus by the governing nations in the representative sample to ultimately address the time period of preventative action against a biological threat or potential terrorist use of an offensive biological WMD. The actual action indicators reported were coded into one or more of five category types from the coalitions of governments' H1N1 influenza global pandemic reports of after actions and lessons learned. Health security policy biological threat implemented action indicators were coded into one or more of the following five types 1–5:

1. H1N1 Health Security Policy Biological Threat Actions Performed
2. H1N1 Challenges

3. H1N1 Strategic Strengths
4. H1N1 BTA Health Security Policy Strategic Vision Recommendations
5. H1N1 BTA Health Security Policy Leadership Organization Recommendations (Strategies and Priorities)

B. Q3 ANALYSIS

Sample areas A–D BTA actual action indicators

- **3a**: The sample coalitions of governments each had identifiable indicators that demonstrated a biological threat prevention approach in the reported lessons-learned and after-action reports of the global H1N1 pandemic influenza incident of 2009–2010.
- **3b:** Indicators of the biological threat prevention approaches were identified from the H1N1 after-action and lessons-learned reports of the coalitions of governments. The reported actual action indicators identified in the biological threat approaches were then sorted into categories.

The after-action and lessons-learned reports of the H1N1 global pandemic influenza of 2009–2010 of the coalitions of governments were examined for biological threat approach indicators of actual actions. The results for the sample are below and represented in Table 3:

1. H1N1 Biological Threat Approach Results

- A. GHSI lessons-learned and after-action reports examination identified 29 indicators of actual action indicators within the five categories.
- B. EU lessons-learned and after-action reports examination identified 37 indicators of actual action indicators within the five categories.
- C. U.S. lessons-learned and after-action reports examination identified 26 indicators of actual action indicators within the five categories.
- D. U.S. Tribal Nations lessons-learned and after-action reports examination identified 21 indicators of actual action indicators within the five categories.

Table 3. H1N1 2009–2010 After-Action Reported Lessons-Learned Biological Threat Approach Indicators of Actual Actions Results

H1N1 2009-2010 Lessons Learned (LL) Biological Threat Approach (BTA) Indcators Results Areas A-D	
"Actual Actions"	
Coalations of Governments Sample Areas A-D	**Indicators of Biological Threat Approach in Reported Biological Threat Incident of H1N1 Lessons Learned (LL) and After Action Reports**
Indicators of Biological Threat Approach Categories 1 - 5	1. H1N1 LL HSP Performed 2. H1N1 LL Challenges 3. H1N1 LL Strategic Strengths 4. H1N1 LL Health Security Policy Strategic Vision Recommendations 5. H1N1 LL Health Security Policy Strategies and Priorities Recommendations
A. Global Health Secuirity Initiative	H1N1 Biological Threat Approach Lessons Learned Indicators = 29
B. The European Union	H1N1 Biological Threat Approach Lessons Learned Indicators = 37
C. The United States	H1N1 Biological Threat Approach Lessons Learned Indicators = 26
D. U.S. Tribal Nations	H1N1 Biological Threat Approach Lessons Learned Indicators = 21

C. Q3 FINDINGS

1. Key Findings

Biological threat approach was identified for each of the coalitions of governments in the sample. The examination of biological threat approach indicators of actual actions were identified in the respective sample of coalitions of governments reported lessons-learned and after-action reports addressing an actual health security biological threat. The H1N1 global pandemic influenza of 2009–2010 was utilized as an actual biological threat global incident for the purposes of this study.

The sample was the same four coalitions of governments: the Global Health Security Initiative, the European Union, the United States and U.S. Tribal Nations. Of the four areas in the sample coalitions of governments, the area (B), European Union, ranked with the highest number of biological threat approach indicators of actual actions.

The biological threat approaches identified in the study of Question 3 of an actual biological threat incident of H1N1 were used in the next steps of the study to further examine biological threat prevention methods.

2. Patterns and Trends

- A specific biological threat prevention policy was not clearly identified in the lessons-learned or after-action reports for the sample.
- The absence of common language to describe the biological threat approach of the sample of coalitions of governments that was found in Q1 from examination of the stated health security policies was also found in the reports, for the same sample, of the lessons learned and after action of the H1N1 global pandemic influenza event of 2009–2010.

V. H1N1 GLOBAL PANDEMIC BIOLOGICAL THREAT PREVENTION TRANSNATIONAL COMPARISON

Question 4 (Q4): How is the time period of prevention of the reported actual actions similar or different between the biological threat approaches of the coalitions of governments?

A. Q4 METHOD

1. Step 4a

Each actual action was coded into one or more of the four time categories of Q2:

- TT0 pre-incident prevention measure
- TT1 pre-incident preparedness measure
- TT2 incident response measure
- TT3 post-incident recovery measure

2. Step 4b

Tallies for each time period were computed and comparisons were drawn of H1N1 biological threat approach indicators within the five categories between the coalitions of governments.

In order to identify the prevention elements within the sample's actual biological threat approach utilized during H1N1, the differences of the indicators of the biological threat approaches of the sample were identified by time periods. To identify prevention elements within the biological threat approaches of areas A–D, the biological threat approach reported actual actions were sorted, coded, and categorized by time. Time periods were coded into one or more of four categories of time periods labeled "time tiers" as described in Table 4. The sample of coalitions of governments actual actions were examined for analysis. The identified biological threat approach identified in Step 3a represented the sample coalitions of governments reported actual actions for a biological threat for the purposes of this study.

The numbered reported biological threat approach elements were subsequently sorted, coded, and categorized by time periods for further analysis. These time periods

were identified as time tier 0 through time tier 3 according to the action phase of the specific biological threat approach element of the standard emergency management cycle utilized in each of the respective coalition of governments. This emergency management cycle is prevention, preparedness, response, and recovery.

The differences found in the sample's reported actual actions for time period of prevention within their reported biological threat approach were examined and compared. Results and findings of the analysis which identified the various differences of the biological threat approach of the sample coalition of governments reported actual actions in the H1N1 pandemic influenza 2009–2010 by time periods**.**

The biological threat approach reported in after action and lessons learned of the H1N1 global pandemic influenza of 2009–2010 of the coalitions of governments were then identified by the time period of prevention. To identify prevention elements within the biological threat approaches of areas A–D, the differences of the biological threat approach elements were sorted, coded, and categorized by time periods. The data was coded into one or more of four types of time periods that were then labeled "time tiers" as described in Table 4. Note: it is possible for one indicator to appear in multiple time categories depending on where the sample area may have used an indicator in another time period choice. Any of the biological threat approach indicators may appear in multiple time categories based upon each of the sample's stated health security policies or the sample's after action lessons learned reported of the H1N1 global pandemic influenza.

Differences of the coalitions of governments' actual actions were compared for the time period of prevention of terrorist use of a biological weapon of mass destruction within the sample's stated biological threat approach.

To further study the prevention scope of the larger biological threat approach reported in the after-action and lessons-learned reports of H1N1 of the sample for the time period of prevention, elements that were sorted, coded, categorized, and identified by time periods were then examined.

B. Q4 ANALYSIS

Sample areas A–D biological threat approach stated actual actions and prevention:

- 4a: Each coalition of governments had identifiable intended actions within its biological threat prevention approach identified from the after-action and lessons-learned reports.
- 4b: The actual action indicators of the biological threat prevention approach were identified from the coalitions of governments' after-action and lessons-learned reports and sorted into categories. The results for the sample:
    - A. GHSI H1N1 global pandemic reported in the time period of prevention category 15 actual action indicators representing 51.72% of the GHSI after action and lessons learned.
    - B. EU H1N1 global pandemic reported in the time period of prevention category 25 actual action indicators representing 67.57% of the EU after action and lessons learned.
    - C. U.S. H1N1 global pandemic reported in the pre-incident period category 5 actual action indicators representing 19.23% of the U.S. after action and lessons learned.
    - D. U.S. Tribal Nations H1N1 global pandemic reported in the time period of prevention category 10 actual action indicators representing 47.62% of the U.S. Tribal Nations after action and lessons learned.

Table 4. H1N1 2009–2010 After-Action Reported Lessons-Learned Biological Threat Approach Indicators of Actual Action Results

H1N1 Lessons Learned (LL) Biological Threat Approach (BTA) Indicators Results by Time Tiers					
"Actual Actions"					
Coalitions of Governments Sample Areas A-D		Time Period	Time Period	Time Period	Time Period
Timeframe Purpose Assumptions Time Periods of Time Tier 0 - Time Tier 3		Time Tier 0 (TT0) Stop or Counter Biological Threat	Time Tier 1 (TT1) Biological Threat Will Occur	Time Tier 2 (TT2) Biological Threat is Occuring	Time Tier 3 (TT3) Biological Threat Has Occurred
Time Period Criteria Time Periods of Time Tier 0 - Time Tier 3		Pre-incident Prevention Measure Occurs in Time Period Before Incident	Pre-incident Preparedness Measure Occurs in Time Period Before Incident	Incident Response Measure Occurs in Time Period at an Incident	Post-incident Recovery Measure Occurs in Time Period after Incident
Homeland Defense and Security and/or Emergency Management Activities of Time Tier 0 - Time Tier 3	Total indicators of Biological Threat Approach in reported lessons learned and after action reports for H1N1 categories 1-5:	**Prevention**	**Preparedness**	**Response**	**Recovery**
H1N1 2009-2010 Biological Threat Approach Categories 1 - 5 Activity Criteria	*1. H1N1 LL HSP Performed* *2. H1N1 LL Challenges* *3. H1N1 LL Strategic Strengths* *4. H1N1 LL Health Security Policy Strategic Vision Recommendations* *5. H1N1 LL Health Security Policy Strategies*	To anticipate and act in advance of a biological threat incident so as to forestall, avert, hinder, counter, thwart or stop the biological threat occurrence	To place in position or condition of a state of readiness for the biological threat occurrence	To answer, in words or action, to a biological threat incident occurrence	To take action to regain, restore, or return to any former and/or better state or condition such as existing prior to a biological threat occurrence
A. Global Health Secuirity Initiative	H1N1 Biological Threat Approach Lessons Learned Indicators = 29	TT0 = 15	TT1 = 25	TT2 = 19	TT3 = 6
Total %		51.72%	86.21%	65.52%	20.69%
B. The European Union	H1N1 Biological Threat Approach Lessons Learned Indicators = 37	TT0 = 25	TT1 = 35	TT2 = 32	TT3 = 28
Total %		67.57%	94.59%	86.49%	75.68%
C. The United States	H1N1 Biological Threat Approach Lessons Learned Indicators = 26	TT0 = 5	TT1 = 21	TT2 = 25	TT3 = 8
Total %		19.23%	80.77%	96.15%	30.77%
D. U.S. Tribal Nations	H1N1 Biological Threat Approach Lessons Learned Indicators = 21	TT0 = 10	TT1 = 17	TT2 = 12	TT3 = 12
Total %		47.61%	80.95%	57.14%	57.14%

C. Q4 FINDINGS

1. Key Findings

The scores of the indicators of the time period of prevention (TT0) category did not rank high in any of the areas A, B, C, or D. Neither of the prevention time period rankings were the first nor second highest ranking rate for reported actual actions of the biological threat approach elements of the H1N1 biological threat event for the sample of this study. Yet both the sample areas (B), European Union, and (D), U.S. Tribal Nations, trended higher scores in the time period of prevention than their advisory or advisory/regulatory areas. The area (B), European Union, compared to the area (A), GHSI, and the area (D), U.S. Tribal Nations, compared to the area (C), the U.S.

The sample areas (B), European Union, and (D), U.S. Tribal Nations, both reported higher biological threat prevention actual actions than their advisory coalition of governments. The GHSI serves as an advisory to the European Nations' leadership on biological threat. The United States serves as an advisory and federal regulatory governing body to the tribal nations. Both sample areas trended in a different direction than their respective advisory governments in the time period of prevention for the reported actual actions of the biological threat incident studied.

The time period of focus of the reported actual action indicators of the coalition of governments' biological threat approaches of the H1N1 global pandemic influenza of 2009–2010 were used in the next steps of the study to further examine biological threat prevention methods.

Table 5 represents the differences of each area's A–D actual action indicators of the sample of the coalitions of governments reported H1N1 lessons-learned biological threat approach of the time periods of prevention (TT0), preparedness (TT1), response (TT2), and recovery (TT3). The emphasis of time periods are identified per the results of the reported actual actions biological threat approach indicators scored per time period of each of the samples. For the purposes of this study, the biological threat approach indicators for each of the areas of the sample to include the Global Health Security Initiative, the European Union, the United States and the U.S. Tribal Nations are representative of the actual action indicators identified in their respective global or national health security H1N1 Influenza Global Pandemic 2009–2010 after-action and lessons-learned reports.

To further study the prevention scope of the actual actions reported for the sample's H1N1 after-action and lessons-learned reports, the specific indicators of the time period of prevention were sorted, coded, and categorized by time periods, and then examined and compared. Results and findings of the analysis identified the elements for the time period prevention (TT0) (see Table 5).

Table 5. H1N1 2009–2010 After-Action Reported Lessons-Learned Biological Threat Approach Indicators of Actual Action Results Time Period TT0 Prevention

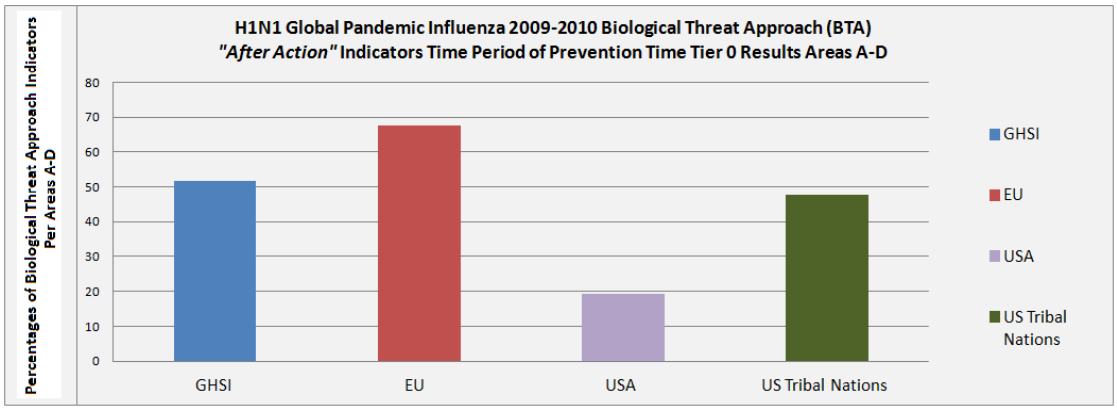

Table 5 also depicts the reported actual actions of the H1N1 biological threat incident examination. The area (B), European Union, results in the time period of prevention of TT0 higher than the area (A), Global Health Security Initiative; and the area (D), U.S. Tribal Nations, results in the time period of prevention of TT0 higher than area (C), United States. These results are interesting in that both areas A and C of the sample were coalitions of governments that serve in an advisory, and/or regulatory capacity to the areas B and D. The Global Health Security Initiative is a key health security advisor to the European Union and the United States is a key advisor to the U.S. Tribal Nations.

2. Patterns and Trends

The study of the actual action indicators is similar to the pattern of the biological threat approach of the sample.

- A pattern emerged that identified key transnational partners, the Global Health Security Initiative, and the European Union, as well as key U.S. Tribal Nations homeland defense partners, are trending to function and perform health security policy biological threat decision making that focuses on building capacity to perform prevention of a successful terrorist use of a biological weapon of mass destruction. In contrast, the examination of indicators reflects that the United States appears to be the exception with the focus of indicators representing the time period of prevention being the lowest of the U.S. rankings. The time period of response scored the highest within the U.S. rankings, with the time period

of preparedness scoring the second highest within the U.S. time period rankings.

- Figure 6 identifies that key transnational partners to the United States, such as the Global Health Security Initiative and the European Union, are trending to increase function of health security policy biological threat decision making that occur in the time period of prevention.
- Additionally, key U.S. Tribal Nations homeland defense partners' biological threat approach indicators also reflect a trend toward the time period of prevention above the indicators identified of the U.S. national biological threat approach. The U.S. is one of the U.S. Tribal Nations' identified key intergovernmental advisors.

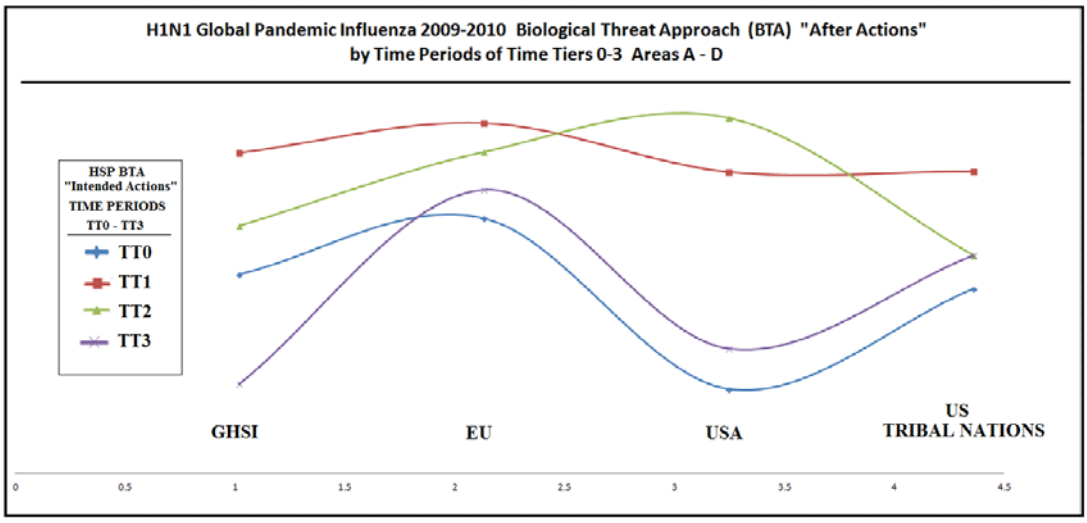

Figure 6. H1N1 2009–2010 After-Action Reported Lessons-Learned Biological Threat Approach Indicators of Actual Action Results Time Periods TT0–TT3

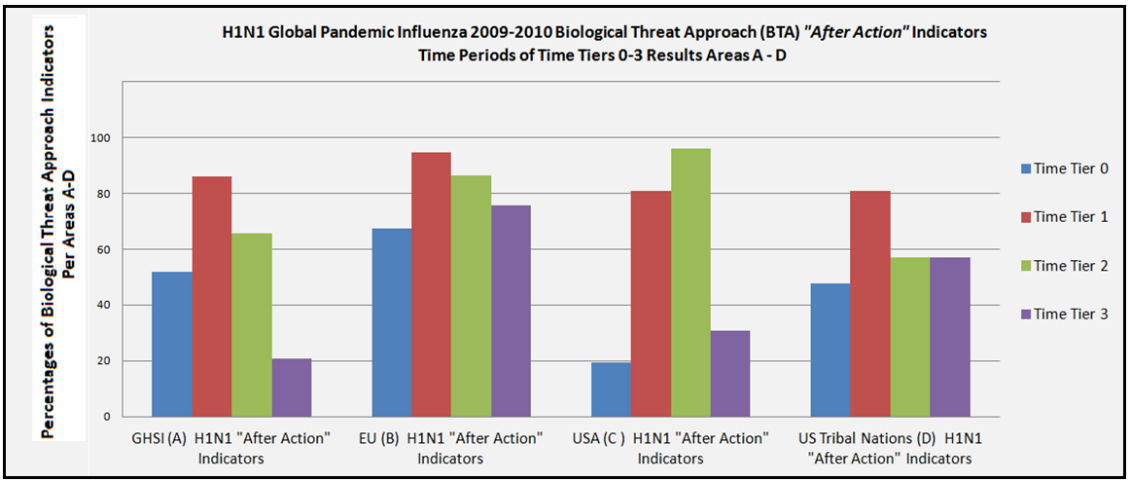

Figure 7. H1N1 Global Pandemic Influenza 2009–2010 Biological Threat Approach Reported After Action Indicators of Time Tiers 0–3

The results of the lessons learned reported of the H1N1 influenza global pandemic 2009–2010 reveal that although the time period of prevention (TT0) is stated as a key strategy and time period for the biological threat approach of each of the areas A–D, the actual actions of the reported biological threat approach in the respective H1N1 lessons-learned reports' scores were identified highest in the time period of response (TT2). Response biological threat approach elements are when a biological threat has occurred and response is activated.

Government leaders emphasize intergovernmental strategies and resources to specific health security policy phases of emergency management. These phases of emergency management, prevention, preparedness, response, and recovery, are within time periods. The time period chosen for placement of the intergovernmental strategies and resources can limit or enhance methods available for leadership decisions within that specific time period. Ultimately, the time period that the strategies and resources are placed within can determine how robust the biological threat approach capacity can be. For example, a strategy that is placed and implemented in the time period of prevention, which is before the incident occurs, can build toward the prevention of the terrorist use of a biological WMD. However, a response or recovery time period includes the loss of opportunity to prevent the incident, because the incident has already occurred.

The response period (TT2) results highlight a health security policy element that are in the time period as and after an incident is occurring. The time period of response is typically operating from a base of reactionary decision-making elements to address a biological threat incident. The sample areas which select the time period of prevention (TT0) focus health security policy elements that are proactive decision-making elements to a biological threat incident. These decision-making time periods vary in both the risk management time protection needs and the potential access to time as a resource to address a biological threat.

Reactionary decision-making elements tend to be performed in a short-term window with intense speed. Prevention forecasting and decision-making elements tend to be performed in a long-term window with purposeful speed based upon consideration of multiple factors across multiple time periods.

Further study is needed to access both decision making time factors in active development time periods.

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VI. PERIOD OF PREVENTION TIME IN HEALTH SECURITY POLICY AND H1N1 GLOBAL BIOLOGICAL THREAT TRANSNATIONAL COMPARISON

Question 5 (Q5): How do the stated intended action indicators compare to the reported actual action indicators of the biological threat approaches of the coalition of governments for the time period of prevention?

A. Q5 METHOD

1. Step 5

Tallies for each time period were compared between the stated intended actions and the reported actual actions of the identified biological threat incident of H1N1.

2. Step 5a

A comparison of the number of pre-incident stated health security policy intended actions for time period of prevention and the number of the biological threat incident of H1N1 post-incident indicators of reported after-action reports was performed.

The biological threat approach time period of prevention for stated indicators of intended actions of the sample's health security policies were examined for potential differences or similarities. The intended actions were then compared to the indicators of the reported actions of the identified biological threat incident of the H1N1 pandemic influenza infectious disease outbreak of 2009–2010 of the same sample. The results of the difference between the intended actions and the actual actions were studied.

The biological threat approach for the coalition of governments in the same sample, (A) Global Health Security Initiative, (B) the European Union, (C) the United States, and (D) the U.S. Tribal Nations, was identified as representative of the respective leadership decisions identified in the sample of global or national health security policies.

The time period of prevention of the sample's biological threat approach was identified as the time period "left of boom" of the use of a biological weapon of mass destruction. The actions of the coalition of governments were studied to examine any divergent or inconsistent actions in the area of the representative intentions to address a

biological threat. The number of category-type elements identified in the stated intended actions biological threat approach was then compared to the study of the number identified in the sample's reported actual actions of the biological threat incident studied. Any divergence of the stated intended actions was identified by the actual actions within stated and reported time periods. The divergence in the categories was then counted to determine a score for each of the sample coalitions of governments. This score, labeled the difference of percentages, was the total derived from the following calculation process.

3. Step 5a Difference Calculation (DC)

DC Step 1 of the health security policy biological threat approach difference calculation steps of intended actions (IA) and actual actions (AA):

- HSP BTA IA DC **Step 1a:** Identified the number of indicators of the health security policy stated intended actions representing areas A–D indicators total as 100%.
- HSP BTA IA DC **Step 1b:** Identified the number of indicators of the health security policy stated intended actions representing areas A–D by time period.
- HSP BTA IA DC **Step 1c:** Compared the stated intended action indicator scores to the after-action indicator scores by time tiers 0–3 in areas A–D.

DC Step 2 of the H1N1 biological threat approach variance rate steps:

- H1N1 BTA AA DC **Step 2a:** Identified the number of indicators of the global biological threat incident of H1N1 reported after action representing areas A–D indicators total as 100%.
- H1N1 BTA AA DC **Step 2b**: Identified the number of indicators of the global biological threat incident of H1N1 reported after action representing areas A–D by time period.
- H1N1 BTA AA DC **Step 2c**: Compared the global biological threat incident of H1N1 reported after-action indicators representing areas A–D.

4. Step 5b

DC Step 3 Comparison of the HSP and H1N1 to identify potential gap or difference of IA to AA:

- DC Step 3: The stated intended action indicator scores to the after-action indicator scores by time tiers 0–3 in areas A–D to the initial health

security policy intended action indicators scores and the global biological threat incident of H1N1 reported after-action scores representing areas A–D.

- C Step 3a: For the purpose of this study, the difference of percentages is any gap identified from the comparison of the intended action indicators and the after-action indicators by time period percentages. The identified percentage of the initial total available indicators by area compared to the identified percentage of the indicators scores by time period of time tiers 0–3 per the sample areas A–D identified any potential gap or difference of percentages.

The indicator scores of the sample were examined to determine the trend of health security intended actions to address a future biological threat and compare it against the trend of actions that became the emphasis or focus of the sample implemented in a biological threat incident.

Table 6. Difference of Biological Threat Approach Indicators Time Periods TT0–TT3

Variance Rate of Intended Action vs. After Action BTA Indicators by Time Periods for Areas A-D				
	TIME PERIOD PREVENTION TT0	TIME PERIOD PREPAREDNESS TT1	TIME PERIOD RESPONSE TT2	TIME PERIOD RECOVERY TT3
Total # of HSP BTA IA Indicators = X	Total # of Prevention IA Indicators = X	Total # of Preparedness IA Indicators = X	Total # of Response IA Indicators = X	Total # of Recovery IA Indicators = X
Variance Rate by Time Periods = HSP IA Indicators vs. Time Periods Comparison Calculation	Total # of HSP IA Indicators Compared to Total # of HSP Prevention IA Indicators = X %	Total # of HSP IA Indicators Compared to Total # of HSP Preparedness IA Indicators = X %	Total # of HSP IA Indicators Compared to Total # of HSP Response IA Indicators = X %	Total # of HSP IA Indicators Compared to Total # of HSP Recovery IA Indicators = X %
Total # of H1N1 BTA AA Indicators = X	Total # of Prevention AA Indicators = X	Total # of Preparedness AA Indicators = X	Total # of Response AA Indicators = X	Total # of Recovery AA Indicators = X
Variance Rate by Time Periods = H1N1 AA Indicators vs. Time Periods Comparison Calculation	Total # of H1N1 AA Indicators Compared to Total # of H1N1 Prevention AA Indicators = VR X %	Total # of H1N1 AA Indicators Compared to Total # of H1N1 Preparedness AA Indicators = VR X %	Total # of H1N1 AA Indicators Compared to Total # of H1N1 Response AA Indicators = VR X %	Total # of H1N1 AA Indicators Compared to Total # of H1N1 Recovery AA Indicators = VR X %
Variance Rate by Time Periods HSP vs. H1N1 Comparison Calculation	Total # of HSP Prevention IA Indicators Compared to Total # of H1N1 Prevention AA Indicators = VR X %	Total # of HSP Preparedness IA Indicators Compared to Total # of H1N1 Preparedness AA Indicators = VR X %	Total # of HSP Response IA Indicators Compared to Total # of H1N1 Response AA Indicators = VR X %	Total # of HSP Recovery IA Indicators Compared to Total # of H1N1 Recovery AA Indicators = VR X %

The variance rate represents the relationship difference of each area's A–D results per time periods. The time tiers identify action phase time periods at three key incident phases on the time period continuum: the pre-incident time period or "left of boom," the incident time period as "boom," and the post-incident time period or "right of boom" as after a biological threat incident occurs.

The purpose of this section of the study was to examine differences or similarities of the intended actions compared to the actual actions. This examination will assist to

identify whether the focus of resources by time periods, specifically to the time period that is considered "left of boom" (TT0 and TT1), will inform possible future biological threat approach strategies for the United States.

B. Q5 RESULTS

Sample areas A–D biological threat approach differences of stated intended actions of health security policy versus reported response actual actions of sample biological threat incident H1N1 2009–2010 and prevention:

- **5a:** Key results of the difference of percentages comparison data for time tiers 0–3 of the sample areas A–D:
- **5b:** Highlights of the key data results of the difference of percentages comparison of the intended action indicators compared to actual action indicators are listed below. Key results of the variance rate comparison data for the time period of prevention TT0 of the sample areas A–D include the following:
  - A. GHSI indicator scores compared difference of percentages was -21.
  - B. EU indicator scores compared difference of percentages was -32.43.
  - C. U.S. indicator scores compared difference of percentages was -55.35.
  - D. U.S. Tribal Nations indicator scores compared difference of percentages was -41.02.
- **5c:** The highest intended action indicators score in the time period of prevention time tier 0 was reported to area B: The European Union.

Table 7. Difference of Biological Threat Approach Indicators Time Periods TT0-TT3 Areas A–D Comparison

Varience Rate by Time Periods HSP "Intended Action" Indicators vs. H1N1 "Actual Action" Indicators Time Tiers 0-3 Results A-D				
	GHSI (A)	EU (B)	USA (C)	US Tribal Nations (D)
	GHSI %	EU %	USA %	US Tribes %
Prevention Time Period TT0 Time Tier 0 Health Security Policy BTA "Intended Action" Indicators	72.72%	100%	64.28%	88.64%
Prevention Time Period TT0 Time Tier 0 H1N1 BTA "Actual Action" Indicators	51.72%	67.57%	19.23%	47.62%
Differences of Percentages	-21	-32.43	-45.05	-41.02
Preparedness Time Period TT1 Time Tier 1 Health Security Policy BTA "Intended Action" Indicators	90.91%	88.88%	98.21%	90.91%
Preparedness Time Period TT1 Time Tier 1 H1N1 BTA "Actual Action" Indicators	86.20%	94.59%	80.77%	80.95%
Differences of Percentages	-4.71	5.71	-17.44	-9.96
Response Time Period TT2 Time Tier 2 Health Security Policy BTA "Intended Action" Indicators	100%	85.18%	100%	100%
Response Time Period TT2 Time Tier 2 H1N1 BTA "Actual Action" Indicators	65.52%	86.48%	96.15%	57.14%
Differences of Percentages	-34.48	1.3	-3.85	-42.86
Recovery Time Period TT3 Time Tier 3 Health Security Policy BTA "Intended Action" Indicators	72.72%	85.18%	100%	100%
Recovery Time Period TT3 Time Tier 3 H1N1 BTA "Actual Action" Indicators	20.69%	75.66%	30.77%	57.14%
Differences of Percentages	-52.03	-9.52	-69.23	-42.86

C. Q5 FINDINGS AND ANALYSIS

1. Key Findings

Each of the areas in the sample reflected differences in the percentages of its respective scores. When compared, the biological threat approach indicators of the reported actual action indicators were not found to be consistent with the identified biological threat approach stated intended action indicators of the sampled coalitions of governments by time period. The stated intended action indicators in the biological threat approach of all areas A, B, C, and D for nearly each of the categories and classifications reflect that they outscored the reported emphasis of the biological threat approach actual action indicators reported. The indicator scores were scoring higher stated intended action indicators of the sample's biological threat approach stated in health security policy when compared to the indicator scores that the same sample reported in the lessons-learned and after-action reports of the global biological threat of the H1N1 incident. So, indicators of stated intended actions toward the coalitions of governments' biological threat approach by time period were higher than the results of the reported actual action indicators. For example, the time period of prevention stated intended actions were higher scores than the implemented actual action indicators for that same time period.

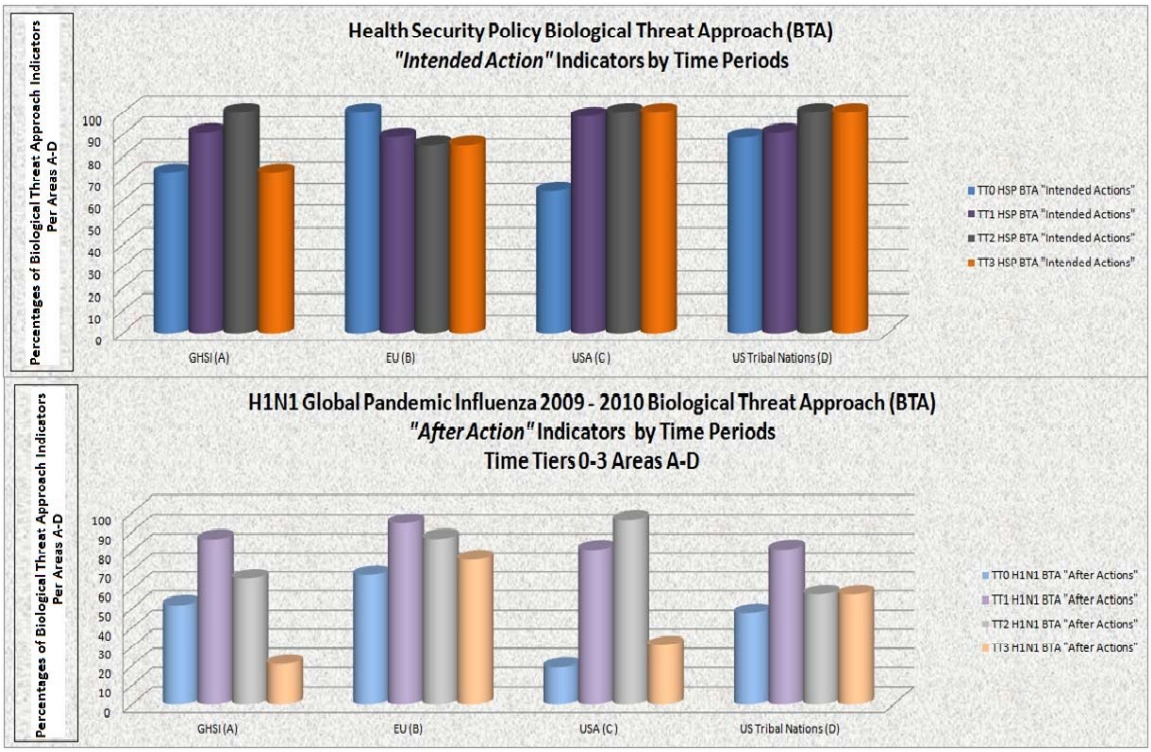


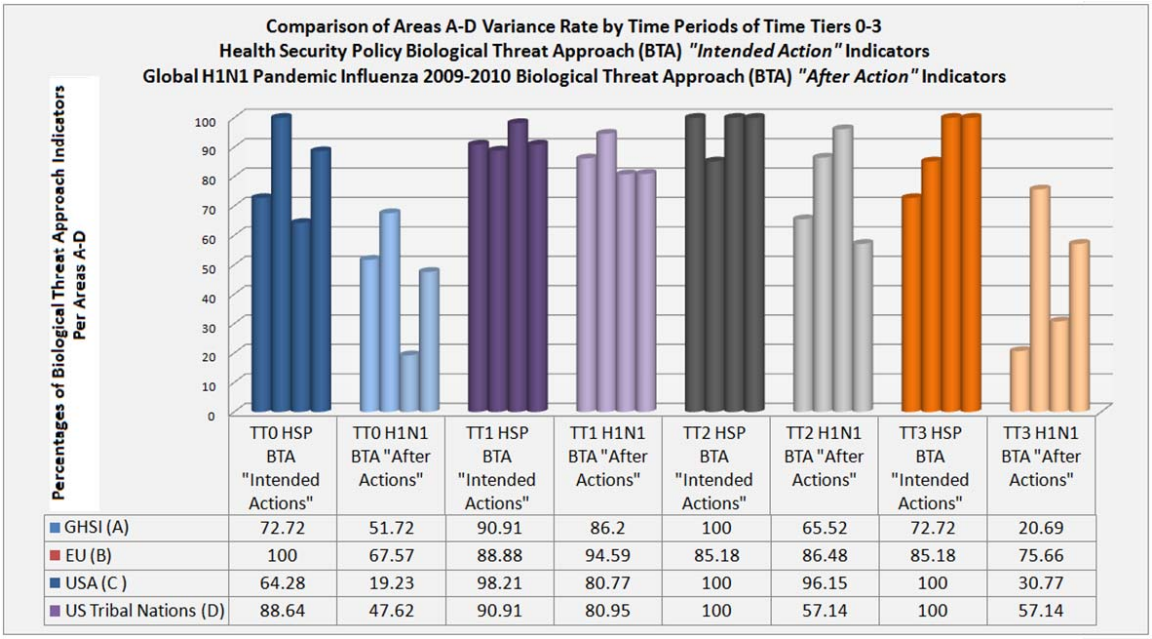
Figure 8. Comparison by Time Periods of Health Security Policy Indicators to H1N1 Global Pandemic Influenza 2009–2010 Indicators

Figure 8 depicts the examination and comparison results of both the stated intended action indicators and the reported actual action indicators of the H1N1 biological threat incident of all four time periods within each separate sample area. For example, the samples of each of the four areas are depicted separately, with scores for each of the four time periods grouped together representing the results of the same area. This allows comparison and examination of that area's entire program operations for each of the four time periods, to include prevention, preparedness, response, and recovery.

The area (B), European Union, results in the time period of prevention of TT0 resulted in higher scores than the area (A), Global Health Security Initiative, and the area (D), U.S. Tribal Nations, results in the time period of prevention of TT0 higher than area (C), United States. These results are interesting in that both areas A and C of the sample were coalitions of governments serving in an advisory, and/or regulatory capacity to the areas B and D, yet they are reporting a lower focus of reported indicators in the time

period of prevention. The Global Health Security Initiative is a key health security advisor to the European Union, and the United States is a key advisor to the U.S. Tribal Nations.

Table 8. Difference of Biological Threat Approach Indicators By Time Periods to Time Periods TT0–TT3 Areas A–D Comparison



	TT0 HSP BTA "Intended Actions"	TT0 H1N1 BTA "After Actions"	TT1 HSP BTA "Intended Actions"	TT1 H1N1 BTA "After Actions"	TT2 HSP BTA "Intended Actions"	TT2 H1N1 BTA "After Actions"	TT3 HSP BTA "Intended Actions"	TT3 H1N1 BTA "After Actions"
GHSI (A)	72.72	51.72	90.91	86.2	100	65.52	72.72	20.69
EU (B)	100	67.57	88.88	94.59	85.18	86.48	85.18	75.66
USA (C)	64.28	19.23	98.21	80.77	100	96.15	100	30.77
US Tribal Nations (D)	88.64	47.62	90.91	80.95	100	57.14	100	57.14

Table 8 depicts the examination and comparison results of both the stated intended action indicators and the reported action indicators of the H1N1 biological threat incident of the same time period in a comparison of each of the areas A–D. For example, the time period of prevention in time tier 0 is reflected by each of the four areas in a comparison of the same time period. This allows comparison and examination of each of the time periods separately and of the intended action indicators to the actual action indicators by time period.

2. 5c: Prevention Time Period Gap

Results of a variance rate comparison of time tiers 0–3 identified a difference in the time period of prevention time tier 0 where the stated intended action indicators of the health security policies were compared to the reported actual action indicators of the

H1N1 global pandemic for each of the coalitions of governments. The prevention time period actual action indicator results comparison identified lower scores in the time period of prevention time tier 0 than the intended action indicators stated in the health security policies in a comparison examination across all of the sample areas A–D.

3. Patterns and Trends

For the time period of prevention time tier 0, each of the sample areas A–D scored lower in the reported actual action indicators of the H1N1 biological threat incident than the same sample of areas stated in its health security policy intended action indicators. It appears the coalitions of governments potentially developed and approved health security policy to address a future biological threat with a higher focus emphasis on the prevention time period, the stated intended actions indicated in their respective health security policies overall were higher than what each of the areas A–D reported as actual actions. The intended actions preferred toward the concept of prevention in policy were higher than the actual actions of a biological threat incident.

When the areas A–D discussed, approved, and then put into stated health security policy the respective coalitions of governments intended actions per indicators studied, the time period of prevention time tier 0 scored higher than any of the same sample reported discussions, and focus of resource concerns, issues, strategies, and priorities in the overall after-action and lesson-learned reports.

Although each of the sample areas A–D have higher indicator scores for the intended actions over the reported after-action indicator scores, area (B), the European Union, had the highest score in the time period of prevention. The European Union also was the only area that scored a positive variance rate score. The sample area with the highest percentage of the time period of prevention indicators in the health security policy intended actions had the only improved or positive variance rate. This was scored by area (B), the European Union. The potential gap was found to be 0. The intended action indicators identified a positive number when compared to the H1N1 actual action indicators. The positive number identified an increase of the focus of resources and strategies reported in the actual action indicators of the biological threat incident of H1N1

when compared to the intended action indicators stated in that area's health security policy. The total number of indicators, area (B), the European Union, had a VR score of 5.71%.

The stated health security policy included the time period of prevention 27 indicators of 27. Likewise, the European Union's reported after-action indicators score was the highest of the sample in the time period of prevention with 25 of 37 reporting 67.57%. So the only areas of the sample that potentially improved or overreached their intended actions by reported actual actions in specific time periods were the preparedness time period of time tier 1 and the response time period of time tier 2. The time period of preparedness appears to have the most improved score.

VII. LESSONS LEARNED FROM INTERGOVERNMENTAL COALITIONS TO ENHANCE U.S. APPROACH TO BIOLOGICAL THREAT PREVENTION

Governments can be challenged when trying to achieve coordinated action in multi-jurisdictional problems, like that of the biological threat (Moynihan, 2009). In the search for a few valuable, successful experiences, two approaches to intergovernmental coordination stand out: the work of the European Union's intergovernmental communication mechanism and tribal forms of governance. The information-sharing systems are distinctive organizationally by the capacity to exchange information across sovereign command control jurisdictional borders while harnessing a necessary intergovernmental span of influence to address the complex problem of a biological threat over expansive territories.

These positive, constructive intergovernmental experiences reveal innovative approaches that improve the likelihood that prevention will be the focus of policies, that the necessary cooperation will be achieved, and that the leadership required to guide these organizations will be effective.

In the sections that follow, this thesis examines these communication mechanisms and intergovernmental information-sharing approaches by looking at the processes used by the European Union and the U.S. Tribal Nations. It also discusses the need for a common health security language in order to enhance intergovernmental unity of effort. Additionally, this thesis discusses the swarming effect in nature[2] and how that effect becomes a preventative countermeasure that protects both the individuals and the group.

Most significantly, this thesis discusses the space between the dots. The space between the dots allows the European Union and U.S. Tribal Nations to get to the

[2] National Geographic staff member Peter Miller, in "The Genius of Swarms," explains, "A single ant or bee isn't smart, but their colonies are. The study of swarm intelligence is providing insights that can help humans manage complex systems, from truck routing to military robots. Deborah Gordon, Stanford University biologist reports, "Ants aren't smart. Ant colonies are." Miller explains ants utilize swarm intelligence to solve problems, "A colony can solve problems unthinkable for individual ants, such as finding the shortest path to the best food source." See National Geographic website for more information: http://ngm.nationalgeographic.com/2007/07/swarms/miller-text.

protection issues of prevention and allows them to move quickly in specific time periods. This thesis shows that working in that space—the space between the dots—and sharing information can make it possible for the U.S. to move more quickly than possible with conventional methods.

A. LANGUAGE AND INTERGOVERNMENTAL UNITY OF EFFORT FOR THREAT REDUCTION

1. Homeland Security Challenge

Each of the sample intergovernmental coalitions evidenced the intention to prevent a biological threat by indicators' studies in the respective stated health security policies. However, no common health security policy language exists, resulting in a lack of common intergovernmental context and guidance of how to address global and national prevention of a biological threat. Additionally, the policies do not have a similar or specified area for defensive biological threat policies in the event of potential terrorist use of a biological WMD.

Health security policy may serve to guide leaders' decision making in the event of a biological threat or a potential terrorist offensive use of a biological WMD. Not having a stated U.S. health security policy of biological threat prevention that has language common to the intergovernmental native language can impede efforts of both transparency and global threat management, and ultimately the potential decision-making speed between intergovernmental leadership.

A robust health security policy could impact the quality and depth of developed prevention methods available as technical guidance and support for leadership decision making. The quality and depth of the health security policy biological threat prevention strategies also impact the successful delivery of prevention actions. The successful application of prevention strategies to the biological threat remains vulnerable when those strategies have not been fully resourced or developed.

2. Opportunity

By having access to a common global and national language of intended actions in health security policies regarding the prevention of biological threats, intergovernmental unity of effort can be enhanced and threat reduction achieved.

3. Data and Discussion

The following sections examine the data and discuss the thought process that led to identifying the challenge. These sections look at intergovernmental and multi-jurisdictional unity of effort and how it can be achieved within the command and control structure. Unity of effort can be accomplished by adapting and utilizing the meta-leadership model and developing connectivity; however, it needs a common language. Accordingly, the meta-intelligence method is a tool that can make a common organizational language possible.

B. INTERGOVERNMENTAL AND MULTI-JURISDICTIONAL UNITY OF EFFORT

> You need to understand that you're never going to achieve unity of command as we know it in the military, and you have to do your best to achieve unity of effort. There are always going to be a lot of different authorities and jurisdictions for the different Cabinet departments and agencies, and your real challenge is to try to bring all that together and point it in the same direction; trying to converge on single effects you're trying to achieve. That's a lot more difficult than it sounds.
>
> –Adm. Thad Allen (USCG-Ret.)

One of the challenges of homeland defense and national security is addressing multi-jurisdictional and transnational issues in a world where activity in one distant location can impact global security. No one sector, organization, or single leader can accomplish the successful prevention of terrorist use of a possible biological weapon of mass destruction. As Admiral Thad Allen (USCG-Ret.) describes, the challenge of current and future disaster management will require leadership who develop, muster, and direct utilization of disaster resources across a crisis. To address global and national security challenges, and specifically biological threats, this type of leadership must successfully lead a multi-jurisdiction, and often intergovernmental, unity of effort.

What type of leadership might perform such a necessary and challenging feat? The National Preparedness Leadership Initiative (NPLI),[3] Dr. Leonard J. Marcus, Colonel (Ret.), Dr. Isaac Ashkenazi, and Dr. Barry Dorn have pioneered the development of the conceptual basis for "meta-leadership," a leadership model that specifically addresses various crisis circumstances requirements (Marcus, Dorn, Henderson, 2006). The meta-leadership model presents concepts for intergovernmental leadership that "strategically [link] the work of different agencies and levels of government" (Marcus et al., 2006).

Marcus describes the need for meta-leadership in relationship to the U.S. government's response to Hurricane Katrina:

> Going forward, better communication and coordination among all levels of government, or "connectivity," will prove crucial. That means not just harnessing electronic technology to forge links among agencies, but also building relationships between people—transforming a culture that champions independent decision making into one that values cooperation. (Kiewra, 2006)

The inclination to view leadership as a top-down process of leader leading follower, typical of hierarchical organizations, often obscures the complexities of leadership. The boss-to-employee relationship is formalized in clear roles, rules, job descriptions, and responsibilities with prescribed performance and productivity expectations (Fernandez, 1991). This dyadic image, however, does not capture what occurs when leaders in bureaucratic organizations seek to influence and activate change well beyond the established lines of their decision making and control. Meta-leadership is mission focused, and these leaders, driven by a purpose broader than that prescribed by their formal roles, are therefore motivated and capable of acting in ways that transcend usual organizational confines.

[3] Of significance is that the NPLI is an initiative developed in collaboration with the leadership of the Centers for Disease Control and Prevention, the White House Homeland Security Council, the United States Department of Homeland Security, and the Department of Defense, and thus integrates different governmental organizations.)

C. META-LEADERSHIP MODEL AND INTERGOVERNMENTAL UNITY OF EFFORT

The meta-leadership concept is the performance of a type of broadly envisioned, overarching leadership that is not focused on unity of command, but rather on a unity of effort powered by influence. "Meta-leadership is particularly valuable in situations where the leader must rely more on influence than authority and where one must lead beyond traditional organizational boundaries" (Marcus et al., 2006).

The five dimensions of the meta-leadership model, as seen in Figure 9, are (1) the person, (2) the situation, (3) lead the silo, (4) lead up, and (5) lead connectivity (Schein, 2004). Each of these dimensions works together to make a collective impact. Shein explains that meta-leaders "seek to achieve results that cannot be accomplished by one organization, unit, or department alone" (Schein, 2004). The model bases the production of organizational connectivity on a hierarchical framework that operates within the levels of each dimension. Another crucial component is that a meta-leader often operates without owning direct authority. Via the influence of vision and leadership, the meta-leader may integrate activities in the method of unity of effort "by intentionally linking the efforts of the many people and many otherwise disconnected organizational units" (Schein, 2004, pp. 3–4).

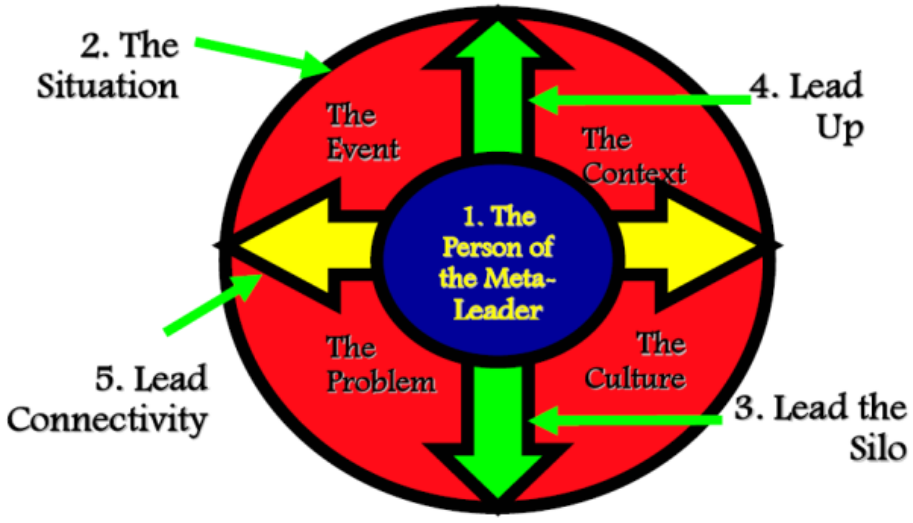


Figure 9. The Five Dimensions of Meta-Leadership (From Schein, 2004)

1. Meta-Leadership Potential to Impact Intergovernmental Connectivity

Connectivity is needed at all levels of government in order to create unity of effort. Meta-leadership is a method to enhance intergovernmental connectivity. Adm. Thad Allen identifies achieving unity of effort as a target for managing the catastrophic incident. Elements of the meta-leadership model impact the organizational connectivity. Allen highlights tools that meta-leadership provides: a method to manage across stovepipe organizations, and the interrelationship of subject-matter experts and policy leaders. The meta-leadership model points to a method to manage the important interface of those two key resources (Marcus, Ashkenazi, Dorn & Henderson, 2007). According to Marcus et al., "In practice, it is a puzzle of optimally engaging three facets—up, down, and across—of organizational connectivity: who are the many people that must be influenced and how can they best be leveraged to prompt forward motion?" (2007, p. 5).

Likewise, the necessary organizational interconnectivity utilized by the meta-leader and discussed by Marcus, Ashkenazi, Dorn, and Henderson is the type of large-scale interconnectivity that the intergovernmental leader seeks to mobilize, steer, and direct for successful outcomes in large incidents. The meta-leader accesses that necessary interconnectivity via the collaborative process. The value of the concept of meta-leadership is not only in the outcome, but also in the "collaborative value," which is a tangible process (Marcus et al., 2007, pp. 3–4). By identifying the gaps between what could or must be done and the will and capacity to do those things, meta-leaders coalesce the knowledge, organizational workings, and frame of reference to achieve an otherwise unachievable cohesion of effort (Kotter, 1996).

2. Challenges of the Meta-leader

Bureaucratic leadership using traditional models that operate on command and control via position of authority versus a position of leading that operates primarily on influence often have personal challenges with meta-leaders within the leadership's organizational structure or jurisdictional purview. The traditional bureaucratic official who is rigidly devoted to administrative procedure struggles with the very nature of the visionary big-picture type objectives of the often influential meta-leader. Thus, meta-

leaders are frequently seen as “trouble,” “going against the grain,” or “seeking to work outside the box,” because they may appear to not be building or protecting bureaucratic turf and territories.

The juxtaposition of these two very different leadership models presents a dilemma of prevention methods. To say that the bureaucratic official, whose job security relies on the impact of positional chain-of-command authority, must consider performing as a meta-leader is paradoxical. The segregation of mission and responsibilities often created by various revenue streams, as well as federal, state, and local laws and regulations, has developed through centuries of operation. The United States’ founding fathers brought patriarchal hierarchies with them while they were fighting for freedom.

Perhaps both influence-driven and positional leadership models are required to address the problems of catastrophic events due to the nature and size of the intergovernmental landscape and multi-jurisdictions governing the catastrophes. Research indicates that intergovernmental meta-leaders require organizational and leadership models that employ influence to move large concepts across various national bodies, such as the health security policy needs of biological threat reduction.

3. Recommendation

Using meta-analysis, develop a strategic meta-intelligence model to support future intergovernmental intelligence products. This recommendation includes evolving meta-analysis to develop a homeland defense intelligence product that will support required biological threat decision making by applying the concept of the meta-leadership model to leaders’ biological threat approach decision-making strategy needs. The proposed model is a strategic meta-intelligence concept which operates in cooperation with the meta-leadership model to develop intelligence products which serve to strengthen the U.S. biological threat approach (see Appendix for details of the meta-intelligence concept). Meta-leadership references the meta-research concept that “seeks systematic themes across many lines of study” (Marcus et al., 2007). The proposed meta-intelligence

model concept incorporates five dimensions[4] to provide an organizational framework for classifying the layers of a biological threat that require national security intelligence products to support timely decision making for biological threat reduction.

To produce senior leadership awareness so that critical biological threat decisions can be completed, the meta-intelligence product must successfully reach the necessary decision-making leaders in a timely manner through the organizational chain of communication. Thus, the intelligence products must process through individual leaders and organizational cultural paradigms. Often the intelligence product is either not produced, or, if presented, it does not successfully complete the entire communication journey.

Due to barriers encountered via the intergovernmental chain of communication (such as organizational constructs, operating silos, and cultural barriers), ultimately, the intelligence product may fail to produce the necessary leadership awareness for timely and accurate decision making. Thus, time and resources that could support leadership's decision making in addressing biological threat reduction would be lost. A solution to this challenge may be found within the meta-intelligence model concept, which could support integrating the meta-leaders' influence into the intelligence foundation of the decision-making process. This would be done via a system of intelligence products that speak to each other in order to provide the context of a problem such as the biological threat. In this manner, the barriers that are a part of information silos to comprehensive critical thinking and timely decision making could be addressed in a new way.

The proposed meta-intelligence products would utilize each organization's identified organizational native language. The meta-intelligence model process could enhance operability and increase support tools for necessary decision making. This, in turn, would support biodefense by performing information sharing within multi-jurisdictional problems so senior leaders would have increased opportunities to direct timely action based partly upon emerging medical intelligence necessary for biodefense.

[4] The five dimensions of the meta-intelligence model are intelligence for (1) the biological threat individual meta-leaders, (2) the biological threat situations or events, (3) the biological threat culture silos, (4) the biological threat context leading up, and (5) the biological threat connectivity leading across.

Meta-intelligence would include, as a piece of the puzzle, an intergovernmental applied significance of intention, with native organizational language providing additional cultural context to support the original intelligence product.

Medical strategic meta-intelligence products would support policy makers and help operational leaders perform necessary and timely biodefense decision making. The meta-intelligence model proposed includes performing meta-analysis and developing national security intelligence products within the five dimensions. These five dimensions work in cooperation with the meta-leadership model.

D. LATERAL LEADERSHIP, INFORMATION SHARING AND THE TIME PERIOD OF PREVENTION

1. Homeland Security Challenge

The challenge is to increase the United States' biological threat approach time period prevention indicators by using multi-jurisdictional information-sharing processes. The health security policies of transnational partners of the United States, such as the Global Health Security Initiative, the European Union, and U.S. Tribal Nations, each have more indicators than the U.S. for the sample's respective biological threat approaches identified in the time period of prevention. As Figure 10 shows, the European Union and the U.S. Tribal Nations had the highest scores of indicators in health security policy for the prevention period.

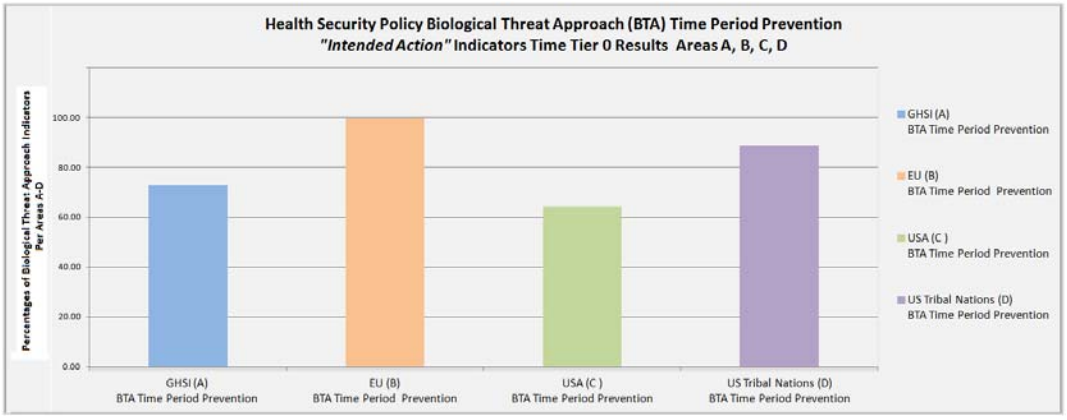


Figure 10. Health Security Policy Biological Threat Approach Time Period Prevention Indicator Results

The pre-incident time is a valuable time to assess and analyze information so as to consider the implications of decisions that impact opportunities to successfully address the offensive use of a bioweapon. Once the incident occurs, the opportunity to address prevention for that incident is lost.

The U.S. biological threat approach challenge is to identify strategies to prevent and reduce the biological threat. One method may be to increase the United States' biological threat approach time period prevention indicators, as both the European Union and U.S. Tribal Nations have higher scores of indicators in the prevention period. This thesis examines the intergovernmental methods introduced by health security policies by which the European Union and the U.S. Tribal Nations perform multi-jurisdictional information sharing in order to provide lessons which support improving the U.S. biological threat approach.

By increasing the biological threat approach indicators within the health security policy for the prevention period (TT0), the U.S. may increase access to the necessary assessment and analysis of biological threat conditions for the purpose of biological threat reduction. Multi-jurisdictional information-sharing processes may make it possible to achieve a more robust base of data and knowledge in order to develop meaningful intelligence products that will support decision making when addressing the prevention strategies in cases of terrorist use of a bioweapon.

2. Opportunity

Utilize intergovernmental information-sharing methods supporting biological threat reduction activities for the prevention period in order to enhance the leadership decision making necessary to address future biological threats.

3. Data and Discussion

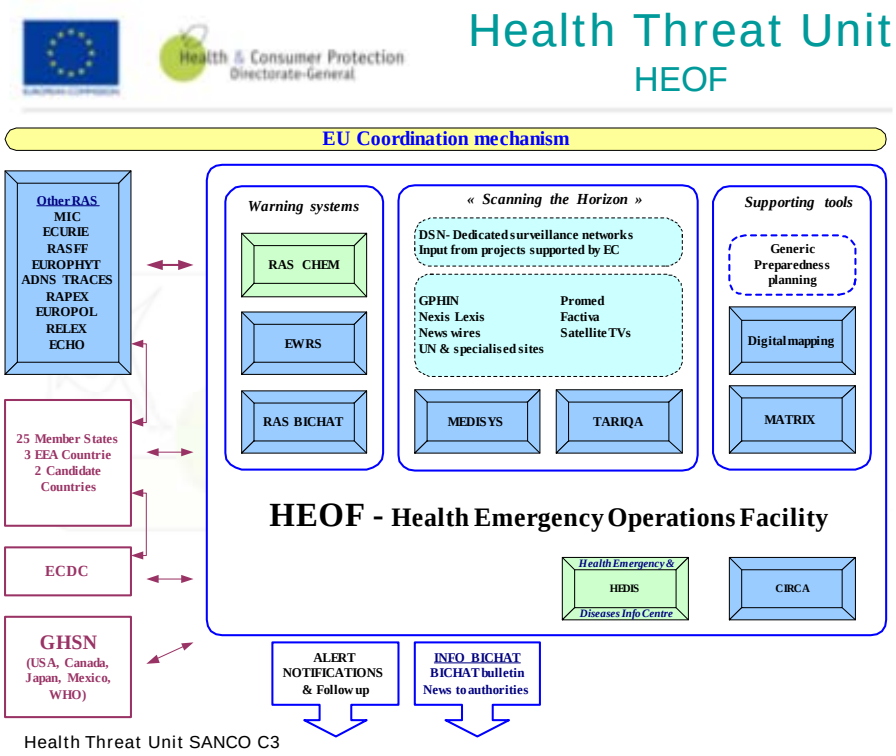
The following sections examine medical intelligence methods of the European Union and the U.S. Tribal Nations in an effort to learn how to increase the United States' biological threat approach time period prevention indicators by using multi-jurisdictional information sharing processes.

VIII. EUROPEAN UNION MEDICAL INTELLIGENCE MODEL

A. EUROPEAN UNION STRUCTURE AND HEALTH SECURITY OPERATIONAL LEADERSHIP MODEL AND INTERGOVERNMENTAL INFORMATION SHARING MECHANISM

1. Information Sharing Approach to Increase Shared Situational Awareness (SSA)

The European Union developed what the Health & Consumer Protection Directorate-General termed the EU Coordination Mechanism (EU Commission, Health Threats Unit SANCO C3, slide 30, 2005). The Health Threat Unit (HTU) operates the Health Emergency Operations Facility (HEOF) to implement alert and warning systems and surveillance, and to provide preparedness planning and support via tools such as digital mapping. This type of alert and coordination system then shares information to the EU member states, European Centre for Disease Prevention and Control (ECDC), additional rapid alert systems, and the Global Health Security Network (GHSN). In turn, those entities feed and share information into the system. The European Union uses this core information-sharing system to develop and maintain an SSA among the entities. The European Union coalition of governments developed the multi-national coordination mechanism that operates as the HTU (see Figure 11) and coordinates intergovernmental information flow and multi-national information sharing.



(EU Commission, Health Threats Unit SANCO C3, slide 30, 2005).

Figure 11. EU EC HTU Information Sharing Nation to Nation Coordination Flow of Information Chart

2. Isolated Span of Control to Integrated Sphere of Influence

The European Union organizational structure supports intergovernmental leaders to address health security issues. The architecture of the structure is developed for specific member-state coordination strategies to be implemented via the HTU and the HEOF to serve the European countries in a manner that extends sovereign command and control of individual nations while protecting the individual sovereignty of nations. The intergovernmental structure provides access to intergovernmental information sharing and a mechanism to perform cooperation and a coordinated span of intergovernmental influence.

Ultimately, the coordination of information flow strategies enhances the EU span of control countermeasures to be used in the event of an intentional biological WMD disease contaminant incident. The challenge is large. The vast span of control area

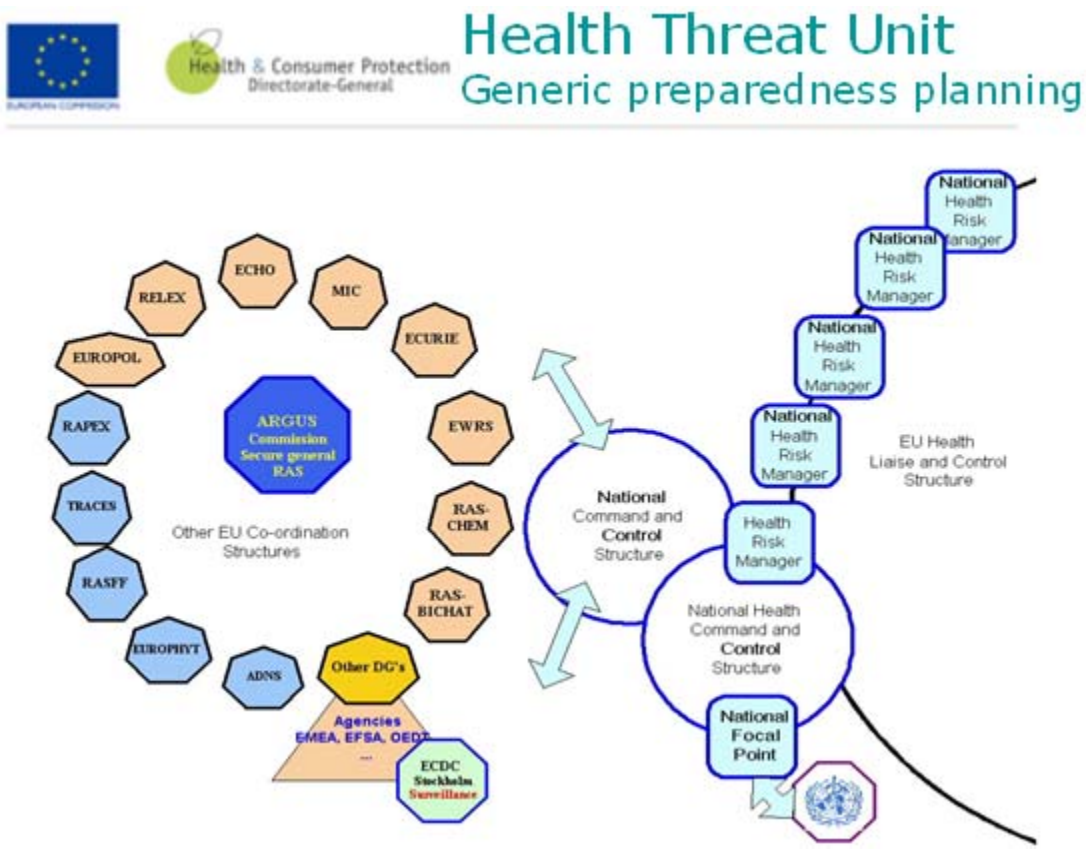
necessary to address a biological threat that crosses multiple jurisdictions and national borders is expansive. The effort requires addressing the sovereignty and borders that are also isolated to the sovereign jurisdiction of each country. The European Union appears to attempt to overcome this challenge by utilizing the intergovernmental sphere of influence. The method is the intergovernmental information sharing developed to address the necessary flow of nation-to-nation information.

The EU's supra-organizational structure includes shared decision-making structures, intergovernmental intelligence access, and innovative emerging medical intelligence tools. With these methods the challenge of an isolated span of control receives a force multiplier effect. This strategic intergovernmental structure and methods of intergovernmental information sharing provide the European Union with both an integrated and increased sphere of influence. This allows a stronger intergovernmental unity of effort and increases the capacity for each nation in the Europe Union to perform methods on an intergovernmental basis that each nation may not likely be able to perform to the same degree independently. In turn, the HTU added the support tool of generic preparedness planning to the HEOF functions. This tool addresses the structure under a collaborative command and control structure of the EU member states. Additionally, the National Command and Control structure includes rapid alert systems and surveillance along with the EU coordination structures. These structures, intergovernmental entities and systems, serve to enhance overall EU capacity to address protection from a biological threat.

B. SYSTEM OF INTERGOVERNMENTAL TRANSNATIONAL LIAISONS AND LATERAL LEADERSHIP MODEL OF THE EU SPHERE OF INFLUENCE

Additionally, the National Health Command and Control structure serves to liaison and address health authorities' role when addressing a health threat. The National Health Command and Control is made up of leaders designated as National Health Risk Managers on specific areas of health threat need. These health threat managers are tasked with communicating with the National Command and Control structure as well as establishing and maintaining cooperation, as demonstrated in the preparedness planning

structures. This type of structure recognizes no individual country as command and control when addressing the biological WMD health threat in the EU system. Rather, collaborative preparedness planning adds function and framing for the collaborative requirements of the member states based on the surveillance and information systems utilized in the coordinated national command and control structure of Figure 12.



(EU Commission, Health Threats Unit SANCO C3, slide 24, 2005).

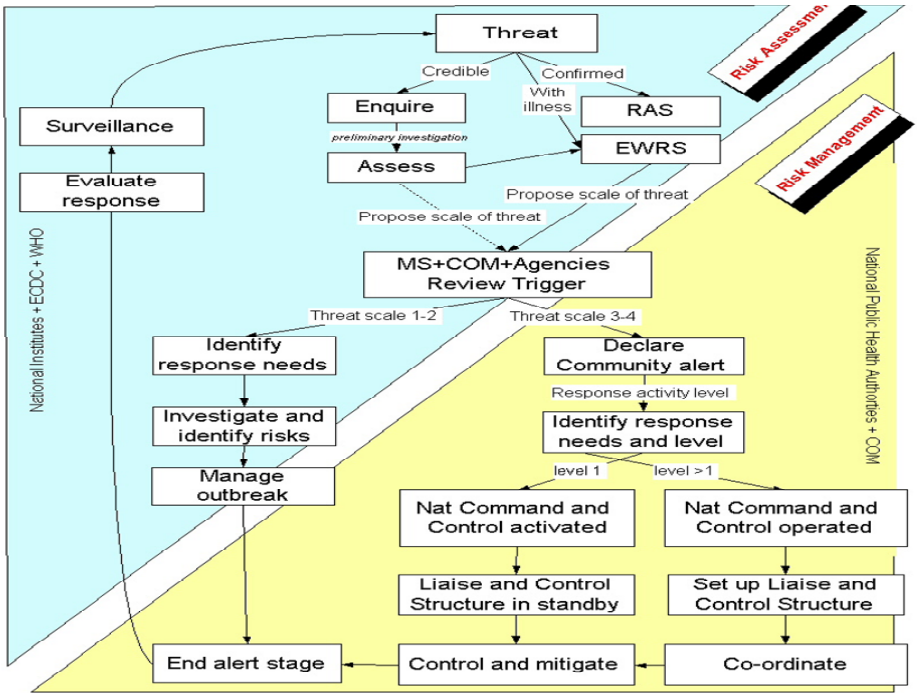
Figure 12. EU EC HTU Information Sharing Health Threat Nation to Nation Structure & Planning Flow of Information Chart (From EU Commission, slide 25, 2005)

The EU has identified two core areas to share information and manage and control health threats: (1) national institutes, ECDC, and the World Health Organization addressing risk assessment, and (2) national public health authorities performing risk management. Risk assessment stages are charged with identifying the health threat,

performing surveillance, and evaluating and addressing signals and alert triggers, which communicate the scale of the potential health threat. The risk management leadership activates the national command and control structure and implements the functional roles of liaison leaders to coordinate cooperative efforts as the fundamental principle in the national health command and control structure.

The liaison function is a key role to the access and flow of the communication mechanism that serves to enhance intergovernmental information sharing. Inside the risk management core area, the structure is identified, not as "Command and Control," but as the "Liaise and Control Structure." This system incorporates the functions of span of control and the sphere of influence into areas that coexist, and it intentionally integrates the two necessary systems. Rather than only a command and control system, or only a sphere of influence system operating information sharing, a third system actively integrates the two systems into enhanced operations to address the biological threat. The intergovernmental communication mechanism (see Figure 13) serves as a force multiplier in addressing a biological threat.

Additionally, the European Union has developed a medical intelligence system that serves as an operational platform to access and enhance shared situational awareness for the EU. This system format also allows the cascade force multiplier effect of performing necessary span-of-control operations while simultaneously performing sphere-of-influence liaison leadership attributes (EU Commission, slide 25, 2005).



(EU Commission, Health Threats Unit SANCO C3, slide 25, 2005).

Figure 13. EU EC HTU Information Sharing Health Threat Liaise and Control Structure (From EU Commission, slide 26, 2005)

These multi-jurisdictional organizational leadership methods also serve to bridge necessary intelligence methods in the area of intergovernmental information sharing. This type of intergovernmental information-sharing method can contribute to the future shared situational awareness necessary to support the U.S. biological threat approach.

IX. U.S. TRIBAL NATIONS MEDICAL INTELLIGENCE MODEL

A. U.S. TRIBAL NATIONS INFORMATION-SHARING APPROACH FOR THE H1N1 2009–2010 BIOLOGICAL THREAT

Like the European Union, the organizational leadership methods of the U.S. Tribal Nations can teach us lessons about intergovernmental information sharing. The tribal communication mechanisms and governance methods of multi-jurisdictional leadership that enhance intergovernmental information sharing can also serve to strengthen our U.S. biological threat approach.

One communication mechanism is the emerging syndromic surveillance system that the tribal health communities put into action early on in the H1N1 global pandemic influenza outbreak. Tribes reported experiencing community alerts and warnings early in the detection of the outbreak of sickness. Rather than waiting to respond, the tribal health community, in partnership with Indian Health Service (IHS), began to incorporate data and technology methods in a new pattern so as to capture emerging information.

Tribal health communities sought to protect their people and prevent the outbreak of the disease by shifting from traditional medical intelligence, which is reactionary information that assists the tracking of the identified diagnosis, typically with lab results. In the interest of seeking prevention of the novel influenza H1N1outbreak in their community, tribal health clinics participated in new information-sharing methods. The results of the new communication mechanism were examined for lessons to enhance the U.S. biological threat approach.

B. U.S. TRIBAL NATIONS / IHS H1N1 SHIFT IN STRATEGIC APPROACH TO MEDICAL INTELLIGENCE

The medical intelligence provided by traditional epidemic intelligence alone was neither efficient nor timely enough for the needs of decision makers in the H1N1 pandemic influenza scenario. To move toward a successful effort of prevention during the initial public health response, U.S. tribes and the IHS utilized the available electronic health data from tribal health clinics to develop a new electronic syndromic surveillance

system called the IHS Influenza Awareness System (IIAS) (Keck, Redd, Cheek, & Layne, 2012).

The new surveillance IIAS reports, posted weekly, provided information to decision makers. The reports provided capacity to utilize timely information regarding influenza-like illness (ILI), influenza vaccination rates, and other categories, so that data results could be utilized for the strategic allocation of limited resources (such as the H1N1 novel vaccine) during the pandemic (Keck et al., 2012).

The IIAS was designed to monitor and report ambulatory visits at the tribal health clinics from walk-ins in categories identified for ILI and to protect patient privacy, the patient visit information was not identified or shared electronically (Keck et al., 2012). The goal of the IIAS syndromic surveillance effort was to identify in a manner as accurately and as timely as possible any cases of ILI that the Center for Disease Control and Prevention's (CDC) Influenza-like Illness Network (ILINET) would normally report (Keck et al., 2012, p. 6). The development inquiry's primary question attempted to determine if the new syndromic surveillance system could report accurately and specifically for the AI/AN population, and yet also report in real time for decision makers. If possible, this type of information sharing of the electronic health data would monitor and provide an at-risk population assessment and an additional source of data to enrich the traditional medical intelligence capacity. The outreach to tribal health clinics might also make available critical missing data for providers or facilities participating in the traditional ILINET reporting.

C. NEW U.S. TRIBAL COMMUNITIES SYNDROMIC SURVEILLANCE SYSTEM RESULTS

Figure 14 below shows the ILI visit percentage and timeframe across the H1N1 pandemic of one year during week 4, April 2009, through week 3, April 2010. The dark line reflects the new IIAS syndromic system and the dotted line reflects the traditional ILINet surveillance reports.

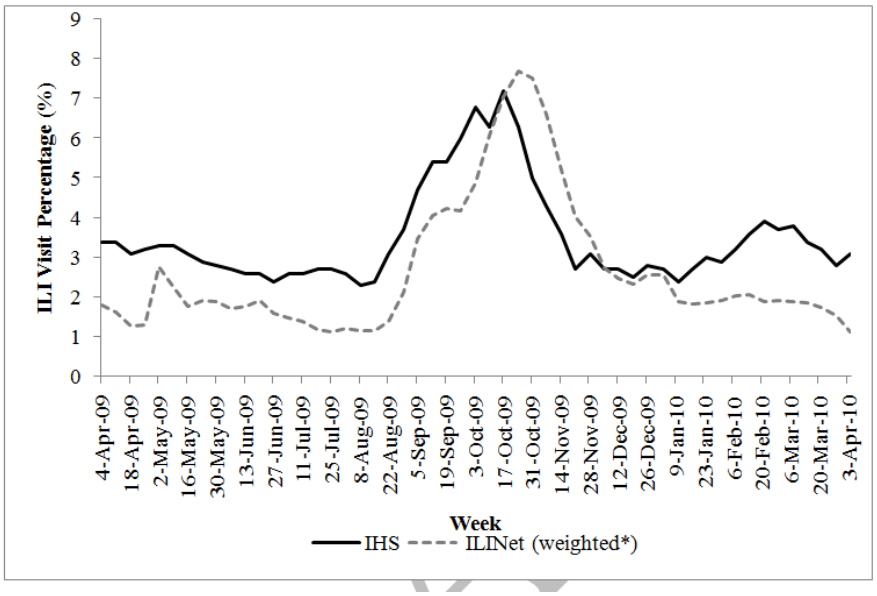


Figure 14. Surveillance Results (From Keck et al., 2012).

The flow of surveillance data processed from ambulatory ILI visits, ILI hospitalizations, and HIN1 immunizations also provided H1N1 vaccine adverse event data (Keck et al., 2012). The IIAS system provided timeliness and an outreach to gather data across a large geographic area to an at-risk AI/AN population during the early intervention time of the H1N1 influenza pandemic. Based on the IIAS syndromic surveillance system data, during a time that vaccine supplies were not yet readily available for the novel H1N1 influenza across the entire U.S. population, IHS was able to prioritize vaccine distribution in the Albuquerque, New Mexico, Navajo Nation, an at-risk AI/AN population area bordering Mexico where the H1N1 disease originated (Keck et al., 2012).

The U.S. Tribal Nations' access and capabilities for intelligence are impacted by the cultural information-sharing processes. The IHS, an agency of the U.S. Department of Health and Human Services (HHS), is the federal health program for American Indians and Alaska Natives and the principal federal healthcare provider to that population due to the government-to-government relationship between the U.S. federal government and the

U.S. Indian tribes.[5] Tribal Epidemiology Centers began in 1996 with core funding from the HHS IHS. There are currently 13 Tribal EpiCenters in the U.S. (Pueschel, 2008):

- 11 Tribal EpiCenters
- 1 Urban Indian EpiCenter (National)
- 1 Native Hawaiian EpiCenter (National)

To address the geographic locations of the urban AI/AN, the Urban Indian Health Institute (UIHI) was created in 2000. The UIHI provides health surveillance and research affecting urban Indians. UIHI serves the Urban Indian Health Organizations, which are private non-profit non-governmental organizations (NGOs). There are reportedly 34 Urban Indian Health Organizations in 19 states servings 94 counties. UIHI reports that of the 4.1 million AI/AN population, 67% live in urban areas (Pueschel, 2008). This fact is significant because the information sharing is of data surrounding a population that is not in one central geographical location. Rather, more than half of the AI/AN population is located off reservation and living in urban areas across the U.S. Together, the IHS surveillance system and the work of the UIHI surveillance system combine to present the epidemic intelligence of U.S. tribal communities. This epidemic intelligence also serves as a potential early alert and warning system for the rest of the United States.

The Navajo Epidemiology Center (NEC) of the Navajo Division of Health based in Window Rock, Arizona, reports examples of limitations of the epidemic intelligence access for U.S. tribal communities. The NEC reports the Navajo Nation geography spans three states and 27,000 square miles (Navajo Epidemiology Center [NEC], 2011, slide 24). Along with the sheer size of the territory is the added challenge of servicing rural and remote areas.

The challenge of limited data to the NEC is a barrier for addressing tribal health capacity for the Navajo Nation. IHS collects nearly all tribal clinical and injury data on the Navajo Nation. The NEC reports challenges that the IHS clinical data system has limited access and Memorandums of Agreement are needed. The IHS clinical data is

[5] This relationship, established in 1787, is based on Article I, Section 8 of the Constitution, and has been given form and substance by numerous treaties, laws, Supreme Court decisions, and Executive Orders (U.S. Constitution Article I, Section 8).

decentralized, so to access the data, the barrier to each health care facility's data has to be addressed. Additional barriers include data quality issues such as completeness, consistency, and validity (Pueschel, 2008).

D. H1N1 PANDEMIC INFLUENZA CATALYST FOR MEDICAL INTELLIGENCE INNOVATION

In the first portion of 2009, while the H1N1 pandemic was initially making the original disease outbreak and what would later become the first wave of the 2009 H1N1 global pandemic influenza, the tribal nations and health care providers in the field were reportedly addressing "walk overs" from Mexico who were bringing illness onto U.S. tribal lands and ultimately into health clinics. U.S. tribes worked with HHS, IHS, and partners CDC and FDA, in an attempt to reach out and access data that could be utilized to report and monitor the rapid changes in the novel disease impacting the AI/AN population. Prevention was identified as an early goal. The utilization of electronic health records (EHR) for public health surveillance work was initiated to develop an H1N1 surveillance system to provide real-time data.

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X. LATERAL GOVERNANCE MODELS OF THE EUROPEAN UNION AND U.S. TRIBAL NATIONS

A. TRIBAL LEADERSHIP MODEL MAY SUPPORT REMOVING SILO BARRIERS TO BIODEFENSE

The American Indian leadership formulated a crosscutting layered leadership system. Gearing's study of a Cherokee village discusses this type of indigenous decision-making activity (Gearing, 2000). The system consists of groups or a body of elders made up of specific categories of tribal members identified by age, gender, and positional duty. The groups were typically identified also by the meeting space access in proximity to the decision-making discussion. The groups in relationship to the decision-making discussion were located strategically for crosscutting discussions representing the needs and perspectives from each clan in the Cherokee village. The discussions were critical to the outcomes for the tribe as the discussions were the basis of decision making.

The body of elders was male and each man represented one tribal clan. The inner council consisted of the foremost officials: one priest chief, three priests, and one secular officer. These officials shared a facilitation and listening witness role to the body of elders. The priest chief had seven inner councils of clansmen in the body of elders, each representing a different clan in the village. The remaining body of elders was identified as the "beloved men" and consisted of the rest of the men aged 55 and older of all of the clans in the village.

Figure 15 demonstrates the tribal leadership leading across silos per the above description from Gearing's study of decision making at a tribal leadership body of elders' meeting of a Cherokee village.

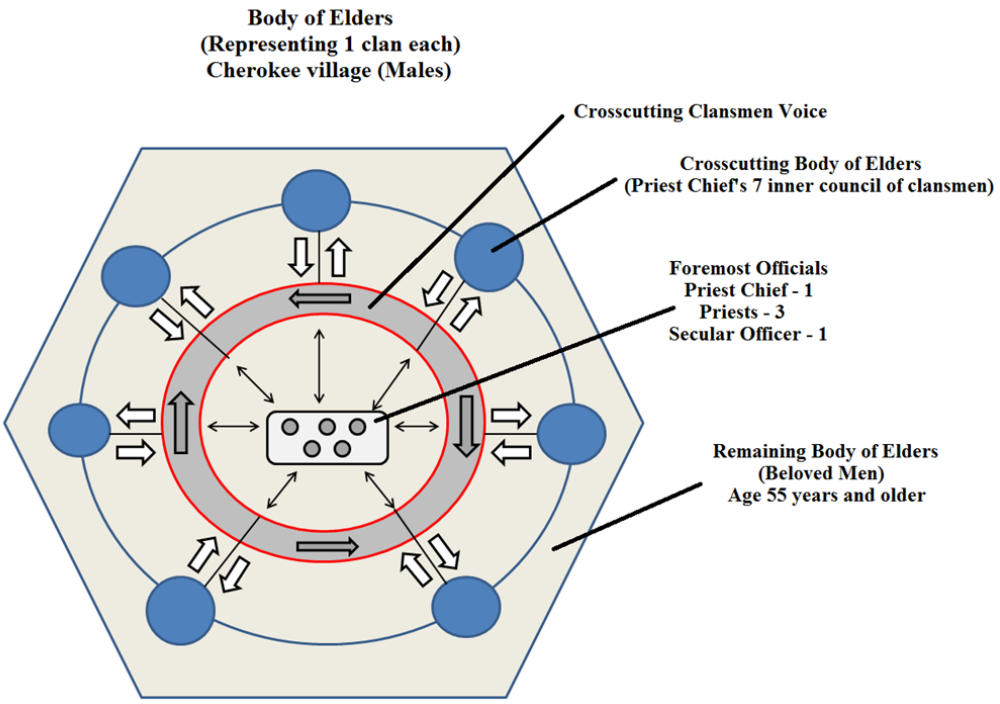

Figure 15. Tribal Governance Lateral Leadership and Two-Way Information Sharing Enhancing Shared Situational Awareness

When this decision-making model is applied to the concept of an intergovernmental mega-community, the crosscutting voice which the body of elders created is significant as a multi-directional flow of information in a lateral line communication mechanism. Thus, the information flow is not a one-way information flow that can be typically found in a command and control scenario. Rather, the information flow is two-way communication between each of the clansmen representatives and the body of elders. Additionally, the discussion and information flow of needs and perspectives of various threats and opportunities to the Cherokee village flows bi-directionally, encircling the layered leadership structure. This allows an opportunity to capture the big picture of an issue and apply the most applicable problem solving to the decision-making process.

Each of the clans retains its own decision-making capacity and its sovereignty or own command and control opportunity over its own specific clan. Yet the clans also engage in an open sphere of influence for the intergovernmental needs of each clan of

that tribal village. Decisions are not completed in a top-down hierarchy model. Rather, tribal leadership in this example included diversity of the clansmen leading across silos of the clans that made up the entire village.

1. U.S. Tribal Nations Lateral Leadership Model to Crosscut Intergovernmental Structure Silo Barriers

Organizational silos exist within the various sectors of private industry, NGOs, and federal, state, local, and tribal governments. Attempting to globally, or even locally, remove the organizational silos is nearly impossible due to political territories existing from organizational hierarchies. To overcome this obstacle, this thesis recommends proactively developing a diverse biological threat approach leadership model utilizing the U.S. Tribal Nations' lateral leadership model. Specific leadership roles should be developed that will receive organizational and administrative leadership liaisons in order to effectively perform intergovernmental and multi-jurisdictional outreach and lead across intergovernmental structure silo barriers to enhance U.S. biological threat approach capacity.

2. Limits on Available Indigenous Leadership Research

Little academic literature exists on AI/AN research of historical and traditional methods of U.S. Tribal Nations governance and leadership. Additionally, gaps exist in the research documented from the U.S. Tribal Nations' perspective. The missing documented accounts of historical AI/AN leadership methods are perhaps due to the cultural traditions of AI/AN oral history and perhaps due to respect of a sacred trust of cultural history at the elder and leader level of tribal members. These cultural traditions are deeply valued and personally transferred from generation to generation in strength and tenderness within and to the tribal community. Researchers tend to have shared a focus on understanding the tribal leadership and governance methods inside the framework of the European-American understanding of "government." This thesis takes a look at traditional and various American Indian leadership methods, many of which are distinct from the governance system of the U.S.

According to *Rebuilding Tribal Nations*, "Cultural mismatch has been at the heart of the dysfunction experienced by many tribal governments over the twentieth century" (Jorgensen, 2007, p. 49). The history, culture, and traditions over generations of the AI/AN experience, both predating the arrival of the founding of a U.S. Constitution and what we know as the United States government of today, as well as current U.S. Tribal Nations' government systems across America, impact the U.S. Tribal leadership processes and decision making of today.

B. EU SUPRA-ORGANIZATIONAL LEADERSHIP MODEL

The EU has developed an information exchange system that creates opportunity for intergovernmental access to medical intelligence among its diverse member states (European Media Monitor System MedISys, 2008). The information access system for the EU biological threat approach includes a liaise control structure, a command control structure, and a critical information exchange mechanism which strategically links the two necessary biological threat approach performance areas to access of medical intelligence. The structure is outlined in the diagram below (see Figure 16). The liaise control structure includes a focus on risk assessment, scientific data, intelligence, and alert and warning systems. The command control structure focuses on notifications, activations and deployments, authorities, and risk management activities. Neither component of the EU model, which encompasses the 27 member states' agreements of information sharing, appear to have a priority or hierarchy; thus, neither the command control structure nor the liaison control structure is outlined with more authority than the other. There is health security equity. The key and critical structure that the EU has developed is the mechanism of information exchange between the two control structures. This mechanism is established as the role of the EU health security liaison leadership. The information sharing is a two-way model that pushes and pulls medical intelligence information for the EU health security biological threat approach.

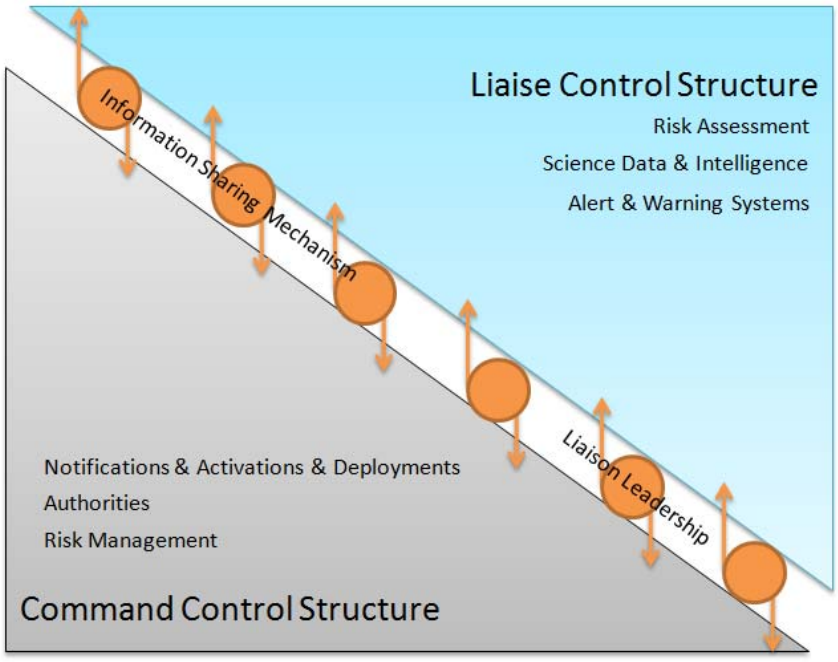

Figure 16. European Union Information Sharing Communication Mechanism

C. INTERGOVERNMENTAL LATERAL LINE COMMUNICATION MECHANISM

Organizational structures, however, experience gaps in lateral communication at all levels. Lateral communication allows for information sharing, problem solving, developing trust, and initiating actions that cross jurisdictions to create a solution to problems that are too complex and overwhelming for one entity. Communication processes are often reactionary, and information is protected and stove-piped. When a crisis or complex problem develops or is recognized, information sharing is sought. Often the interdependence of overarching goals is missed at various levels, and often leaders will spend their time attempting to determine who owns the problem and which jurisdiction it falls in, so as to ascertain if they must address the problem or leave it for others. At some point, complex and overwhelming problems belong to multiple, often cross-jurisdictional, authorities. Some of the complex problems and missions, such as public health and safety, homeland defense, and national security, at some point, belong to everyone.

A lateral line sensory system consisting of layers of lateral leadership is recommended for development to address the barriers of communication and information sharing. If the ability and capacity of the lateral line sensory system of organizational types can be successfully utilized in the form of identifiable structure system dots, then a lateral line sensory system could be developed in a strategic medical intelligence system to support biodefense. The structure system dots would be made of up the designated layers of lateral leadership which are composed of various organizational structures, including the multiple cultural organizational languages and variables as attributes in the framework. Moving toward a swarming type of collective intelligence potentially strengthens both the medical intelligence and the biodefense capacity. The health system composed of tri-sector factors may have, along with law enforcement and intelligence services, one of the initial strongest building bases for an enhanced intelligence capability to successfully create a new medical intelligence system.

1. Shared Situational Awareness

These multi-jurisdictional organizational intergovernmental leadership methods also bridge to intelligence methods in the area of information sharing that contributes to an intergovernmental shared situational awareness. The EU continues to develop multi-national capabilities of alert notifications and a multi-national information distribution system. The information sharing methods would require access equity for the member states. The result would increase the 27 countries' sphere of influence on the capabilities of their SSA and the ability to address a potential biological threat in their regions of the globe. This multi-national cooperation in the supra-organizational structure of the EU extends each member state's sovereign command and control to include a shared resource of multi-national cooperation and coordination capacity for a larger span of influence to protect each individual nation's citizenry.

2. Swarm Intelligence Impacts Real-Time Decisions

Depending on the perspective and differences, clusters and communities will often overlap and form a network. Collective choices in real time, observed in nature in birds flying in flocks or fish swimming in schools, impact time trends and decision

making. By reviewing the theories of how swarming occurs when birds form a flock and fish form schools, medical intelligence framework system support elements can be identified to develop future biological threat approaches that support biodefense. Thus, intergovernmental swarming would be achieved.

D. INTERGOVERNMENTAL SWARMING

1. Homeland Security Challenge

A key challenge to utilizing the natural disease-driven epidemiology approach to addressing a manmade terrorist deployment of a biological WMD is that the terrorist deployment of a bioweapon is a process of intentional and manipulated disease spread. This intentional use of pathogens could be different than a natural disease spread, which can follow a more traditionally anticipated path. Terrorist actions are not as predictable as natural disease spread. The effects of time occurring within an intentional deployment of a pathogen versus a natural biological threat create an additional risk of reduced countermeasure capacity toward a terrorist bioweapon. If the policy and decision-making approach to a terrorist-driven biological threat is premised upon the policy and decision-making of a natural biological threat, decision-making time may be lost.

2. Opportunity

Enhance the U.S. biological threat approach by utilizing the lessons learned from the intergovernmental leadership models of the EU and the U.S. Tribal Nations and by identifying methods of intergovernmental information sharing employed by the coalition of governments to collectively impact decision making. The models may also reveal opportunities to improve future U.S. activity indicators in the prevention period. Additionally, should a terrorist deployment cover multiple locations and need crosscutting time-period decision making, then the concept of intergovernmental swarming (such as discussed in reference to nature's model of SSA method of performing unity of effort) may be an opportunity to strengthen the U.S. biological threat approach.

3. Data and Discussion

The EU and the U.S. Tribal Nations had higher results than the U.S. and GHSI in the prevention period (see Figure 17). Those intergovernmental coalitions also had patterns of tighter grouping of results in the outcomes within the four time periods of prevention, preparedness, response and recovery. The same pattern of results is not represented in the outcomes of the GHSI and the U.S. According to the sample coalitions of governments' health security policies, indicators identified several actions that the intergovernmental leadership intended to execute. But the after-action reviews revealed the indicators of actual actions (identified by time periods of prevention, preparedness, response and recovery), did not have the same emphasis as the stated intended action indicators. Thus, the intended action indicators of the health security policies did not match the implementation action indicators reported.

Although scores of the intended actions and scores of the actual actions have different criteria, for the purpose of this study they each have indicator criteria identifying context for the sample's biological threat approach. The comparison basis is that of the identified biological threat approach of the sample in regard to the prevention period, first pre-incident in the stated health security polices, then post-incident, with the H1N1 incident of 2009–2010 being an actual global biological threat. It is noted that the H1N1 pandemic influenza threat was a natural source and not an intentional terrorist use of a bioweapon. However, by comparing the stated indicator intended actions specific to a biological threat to that of actual indicator actions of a specific threat, the intergovernmental leadership emphasis of addressing biological threats can then be compared.

The U.S. biological threat approach's capacity to address necessary threat reduction activities may be reduced in the prevention period by a shortage of resources, including time. Improving the U.S. national security capacity to address intentions and performance actions to reduce the biological threat in the pre-incident period of prevention can have additional positive impacts proven over time. Additionally, future research and developments can produce additional intergovernmental strategic prevention

methods to enhance the necessary intergovernmental sphere of influence to improve intergovernmental unity of effort to support biodefense.

Also critical to strengthening the concept of whole community is the successful performance of emergency and civil defense activities across the four time periods. Intergovernmental leadership models of the EU and the U.S. Tribal Nations may assist in improving the U.S. biological threat approach in the prevention period, as well as enhance capacity in all four time periods.

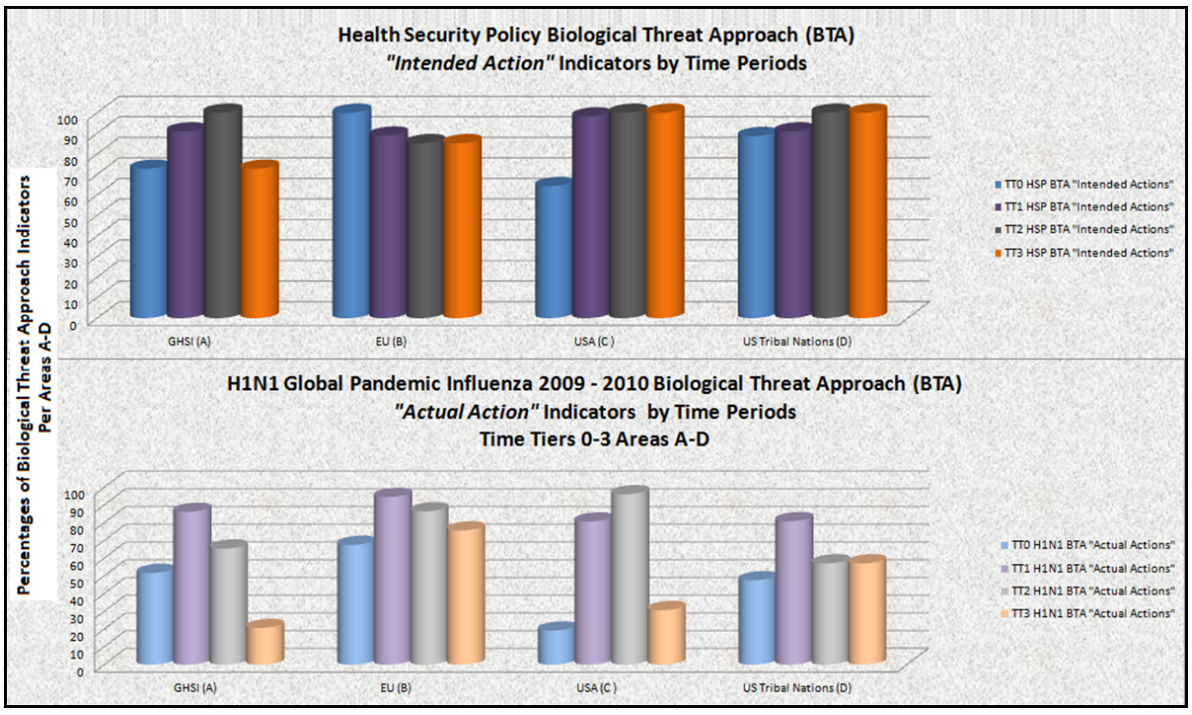

Figure 17. Comparison by Time Periods of Health Security Policy Intended Actions to H1N1 Global Pandemic Influenza 2009–2010

The following sections will examine and discuss the complex intergovernmental organizational structure, its limitations, and the intergovernmental mega-community solution.

E. COMPLEX INTERGOVERNMENTAL ORGANIZATIONAL STRUCTURE

For generations, traditional public health has implemented small scale natural disease management within one clinic or hospital in one health jurisdiction for necessary treatment and containment. Transferring or applying the traditional public health small-scale disease management practices to the concept of a large-scale catastrophic use of an offensive bioweapon is a challenge. The geographical location is a concern, whether inside the borders of the U.S. or abroad. In a global health incident, the threat will require vastly different approaches due to the threat and the management of one of the greatest resources available, time.

Potential smart practices of each intergovernmental organization structure are identified utilizing multi-jurisdictional organizational leadership methods distinct to the EU and the U.S. Tribal Nations, as well as implications of each structure to medical intelligence in the context of public health security needs.

The EU utilizes an organizational structure consisting of various member states, each its own individual state of sovereignty with unique political and citizenry needs. When diverse multi-jurisdiction needs are encountered in the EU, the member states' laws and applications of authority can create various potential choke points for decision making in actions that move across boundaries and territories.

The U.S. Tribal Nations utilize methods similar to the EU supra-organizational structure. U.S. Tribal Nations uniquely utilizes a non-profit sector format to form its governance structure and achieve recognition from the federal government. A tall organizational structure with aspects of a flat organizational structure within various federal agencies is used based on the specific individual federal agency need.

F. INTERGOVERNMENTAL MEGA-COMMUNITY SOLUTION

The biological threat problem requires a multi-organizational solution. In *Megacommunities: How Leaders of Government, Business and Non-Profits Can Tackle Today's Global Challenges Together*, the initiators of a multi-organizational solution are

described as the catalyst to convert a latent structure into an active state (Gerencser et al., 2009).

> A mega-community might already exist in a latent state as a result of the presence of an overlapping set of issues. Most likely, this latent mega-community will have reached a threshold at which the value of the cross sector action is evident. But the mega-community will not move from latent to active on its own. While the potential energy is there, the creation of the mega community requires a catalyst to convert the potential energy into action. Allowing for the fact that in a moment of crisis such as a natural disaster a mega-community might spontaneously emerge, in most cases an initiator or a group of initiators will have to step forward. (Gerencser et al., 2009, p. 113)

Our biological threat problem has a type of existing public health and safety active. Tri-sector overlapping needs and issues exist.

Intergovernmental biological threat approach lateral leaders must be identified to serve as a catalyst activity in a biological threat approach mega-community. To initiate the concept and facilitate building access to layered leadership, a forum must be developed so that these potential lateral leaders can come together and collectively serve as multi-jurisdictional BTA initiator leaders across sectors.

The strategy of addressing intergovernmental cross-sector work with public, private, NGO, and government sectors delivers a broader platform to produce the best outcomes in infectious disease management and disease containment, increasing public health and safety. Additionally, this strategy protects both the civil defense force and the military force operations by their working together to strengthen biological threat capacity to manage infectious disease.

1. Two Dichotomous Decision-Making Systems Applied to the Intergovernmental Mega-Community

Two sharply distinguished decision-making systems exist: the American Indian leadership system model and the U.S. governance system model. Further review of the two systems of decision making allows the impact to the biological WMD threat to be examined.

First, the U.S. government, which derives roots from a European political system, is a bureaucratic organizational structure. In this governance structure authority is translated into public power as the citizenry submits decision making to elected positions that represent the individual among the nation. This power is entrusted to the predetermined laws and standard of rule into an organizational structure of accepted enforcement powers of authority and rule of governance.

Second, the AI governance system is a complex cultural system of tribal leadership, of which no one individual is given his or her freedom of decision making over another body. The responsibility of power and accountability is, contextually, sovereign to the individual. The tribal members protect and respect the freedom of the AI/AN individual while preserving the U.S. Tribal Nations' sovereignty in the right to govern the tribes.

While the U.S. government decision-making system operates as one of checks and balances with power that resides at the state and local levels unless otherwise set by the Constitution. This system flows toward the concept of jurisdictions of governance which utilize a concept of delegated authorities via the citizens within a type of command and control system to implement the power. In comparison, the American Indian governance system operates with a fundamental value of sovereign freedom for the AI/AN individual. This fundamental governance method translates into the upholding of sovereignty issues based in U.S. constitutional rights and treaties. Governance is commonly defined as the exercise of authority, control, or power. Yet the AI/AN upholds cultural values which respects the position of self-governance. According to Tracy Becker and John Poupart, American Indians did not traditionally "govern" themselves, and it is inaccurate to try to fit American Indian leadership paradigms into this conceptual framework (Becker et al., 1997).

2. Inherent Limits of Organizational Structure

Michael G. Jacobides examines the role and limits of organizational structure in his paper "The Inherent Limits of Organizational Structure and the Unfulfilled Role of Hierarchy: Lessons from a Near-War" (Jacobides, 2007). Figure 18 is from an analysis

from the perspective of Greek officials in examination of the impact of their decision-making failures in a near-war scenario. Although the war was averted, a reported feeling of defeat prevailed in Greece. Further examination revealed that the escalation was the result of major underlying processes that were factors underpinning the dynamics of the decision making. The factors identified in this case were decisions based upon "interactions among different organizational subgroups" (Jacobides, 2007, p. 463).

Jacobides goes on to identify that the division of labor, compartmentalization, and the inherent limits of local frames were the lens of perspective through which decisions were made. The hierarchy and lack of hierarchy drove decisions in various confrontational decision points. Jacobides notes (2007) that the organizational structure of the position in the incident impacted the decision that escalated the country toward war. The military naval commander, assigned to and focused on tactical supremacy, interpreted the situation as a need to restore the national symbol. The cultural interpretation was in conflict with the diplomatic strategy. Despite a decision to de-escalate, the diplomatic representative was overlooked in the decision-making structure and not given an opportunity to be the first to respond in the crisis situation. The politician and senior minister, with no direct experience in foreign affairs, defense, or prime-ministerial duties, moved forward in his role as experienced politician, satisfying the media and national opinion while provoking a direct confrontation. Jacobides utilizes his chart (Figure 18) and describes that there is no structure to facilitate the interaction of decision makers from different units to arrive at more nuanced views. According to Jacobides, "There was no mechanism to incite the ministers of Defense and Foreign Affairs to systematically exchange views" (2007, p. 467).

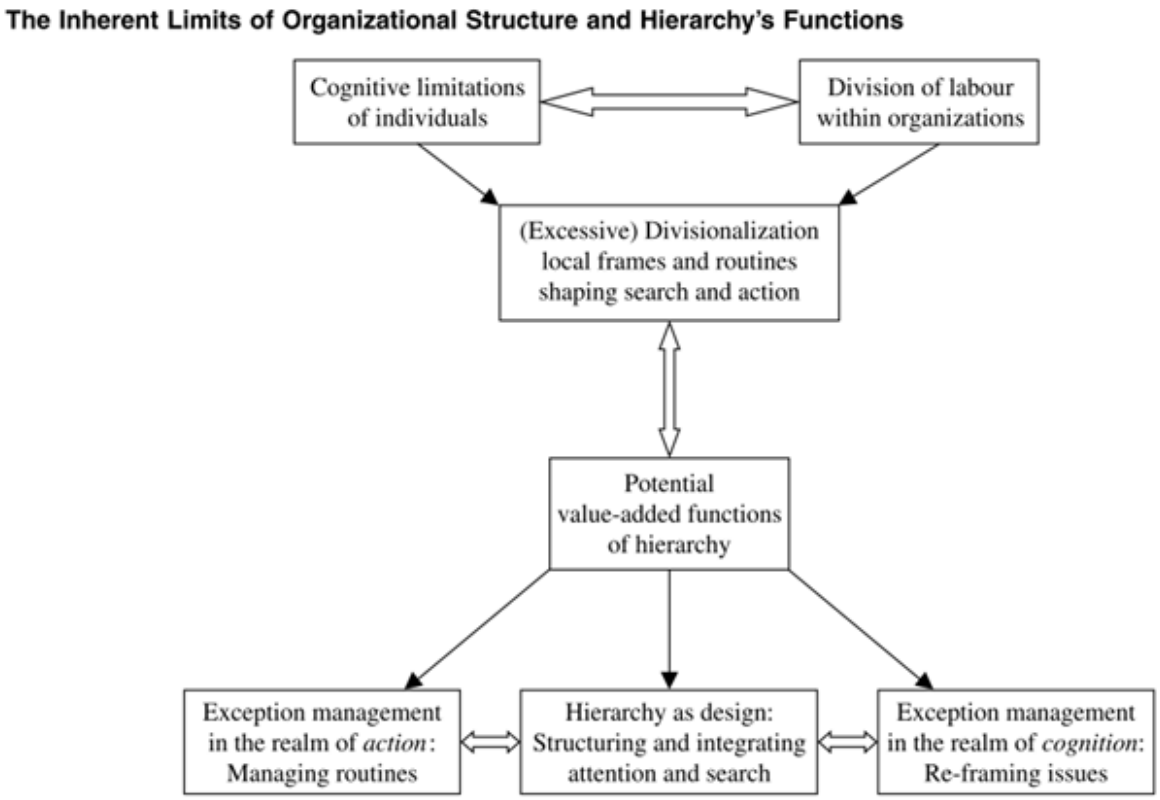

Figure 18. Jacobides' Inherent Limits of Organizational Structure and the Unfulfilled Role of Hierarchy (From Jacobides, 2007)

This organizational diagram of structure and hierarchy's functions shows Jacobides' point that the architecture of an organizational structure presents ways of dividing labor that allow a specific set of informational inputs to process through an organization and impact decision making. The organizational structure can also be such that informational inputs can set new organizational frames to emerge, which impact decision making. Jacobides states, "This is the 'cybernetic control' function of hierarchy" (Jacobides, 2007).

The various organizational structures likely have the information and frames available (Snook 1997; Vaughan 1996); however, Jacobides points out that "they do not partake in the decision-making process" (Jacobides, 2007). The way the information is aggregated and presented affects decisions (George, 1972).

3. Recommendation

The intergovernmental organizational structure that supports the concepts of self-governance may be captured and harnessed for the purposes of enhancing intergovernmental information sharing processes. The use of intergovernmental lateral leadership and decision-making processes in various time periods may trigger access to a pattern of intergovernmental swarming in the grouping relationships of decision-making activities across time periods. This structure may enhance the intergovernmental mega-community to be active, more interactive, and able to access the intangible efforts and patterns of emergence via the communication mechanisms that the EU and the U.S. Tribal Nations have developed. This structure may be the enhanced ability to communicate timely decision making from the intergovernmental models operating in the prevention period that allow both areas in the sample to perform a type of intergovernmental swarming.

Perhaps these identified intergovernmental communication mechanisms are what provided opportunity for the EU and the U.S. Tribal Nations to experience their overall performance effects. For each of the four time periods, they indicated grouping patterns in both the health security policy indicators and the reported after action and lessons learned of the H1N1 global pandemic influenza of 2009–2010. These grouping patterns

resulted in the prevention period scores advancing. Yet the other time periods also scored in a pattern to the collective grouping rather than being not represented or having low scores in comparison to the pre-incident period of prevention.

G. RESEARCH LIMITATIONS

1. Limitations of Natural Biological Threat Strategies to Biodefense Strategies

The lessons learned from the examination of the natural biological threat incident of H1N1 global pandemic influenza of 2009–2010 are not derived from an intentional terrorist use of a bioweapon as a WMD. However, the risk of a terrorist biological threat compared to a natural biological threat has value for consideration in a study of biological threat approach because the natural biological threat also includes the period of disease transmission and the impact of the latent time period during a biological attack scale of potential harm. The manmade threat is growing. Due to the access to life-science expertise and technology advancements, it is possible for pathogens and chemical weapons to be covertly grown, prepared, and transported (Barrett & Goure, 2008, p. 1).

Yet, since there are no historical large-scale terrorist bioattacks to study, the lessons learned from policy and decision making of a large-scale natural biological threat incident must be employed. The study of the health security policy and decision making in the H1N1 global pandemic 2009–2010 is a key factor to presenting a basis upon which to further study and recommend future biological threat-prevention methods.

Recommending future biological threat prevention methods is important because the large scale of a manmade terrorist deployment of a biological WPM can produce more harm and loss of life than a natural biological threat. This is due in part to the causal inference and larger scale of potential harm from an intentional deployment, as well as the deployment impact to the traditional naturally driven pathogen latency time period.

XI. U.S. NATIONAL HEALTH SECURITY FRAMEWORK

The United States' health security policy, which includes the 2009 U.S. National Health Security Strategy (NHSS), provides the first comprehensive strategic approach to addressing U.S. health security, including terrorist attacks (DHHS, 2012). The subsequent 2012 implementation plan defines national health security as follows: "National health security is achieved when the Nation and its people are prepared for, protected from, respond effectively to, and are able to recover from incidents with potentially negative health consequences" (U.S. DHHS, National Health Security Strategy, 2012).

The goals for the 2009 and the subsequent 2012 NHSS framework include (a) building community resilience, and (b) strengthening and sustaining health and emergency response systems. Both goals focus on activities of time tiers 1–3: the periods of preparedness, response, and recovery. Including time tier 0, the prevention period, in the strategic objectives would fill the gap created by having the operational capabilities and strategic objectives focused only on the goals of time tiers 1–3.

The objectives of the 2009 NHSS framework, in cooperation with the *2012 Implementation Plan for the U.S. National Health Security Strategy*, are as follows (DHHS):

- Informed and empowered individuals
- National health security workforce
- Integrated, scalable healthcare delivery systems
- Situational awareness
- Timely and effective communications
- Effective countermeasures enterprise
- Prevention or mitigation of environmental and other emerging health threats
- Post-incident health recovery in planning and response
- Cross-border and global partnerships to enhance national, continental, and global health security

- Science, evaluation, and quality improvement

A key theme and assumption of the 2012 NHSS implementation plan is based on the premise that "achieving national health security requires a collaborative approach" (DHHS, 2012).

The recommended strategic objectives in Figure 19 would partner to achieve national health security based upon lessons learned from the health security policy review and biological threat incident reports of the H1N1 influenza global pandemic of 2009–2010. Additionally, the recommendations include lessons learned from the medical intelligence model study of the EU and U.S. Tribal Nations. For reference, recommendations have been inserted into the relevant component areas of the current NHSS framework model (DHHS, 2012).

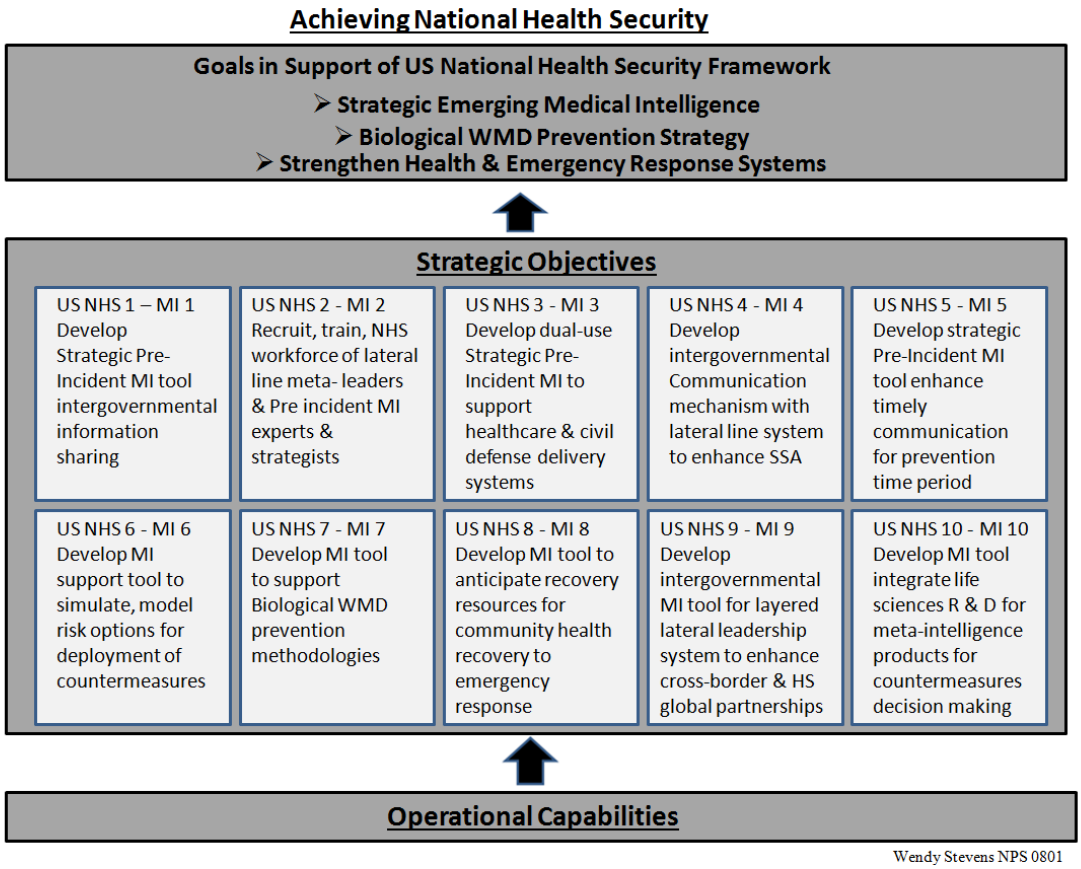

Figure 19. NHSS NHS Framework Including Recommended Medical Intelligence Strategic Objectives. Achieving National Health Security

A. ACTIONABLE POLICY RECOMMENDATION TO SUPPORT U.S. NATIONAL HEALTH SECURITY FRAMEWORK

The recommended processes would use technology to integrate meta-intelligence and intergovernmental communication mechanisms in order to develop medical intelligence to enhance decision making and support biodefense. Strategic pre-incident medical intelligence should be applied to support the development of biological threat prevention methods, and to strengthen and sustain public health and emergency response systems.

Recommended strategic objectives for the development of a communication mechanism and lateral line framework to support biodefense follow.

1. Recommended U.S. Medical Intelligence Framework

The following goals support the proposed NHSS National Health Security (NHS) framework model, which includes recommended medical intelligence strategic objectives.

- Build strategic pre-incident medical intelligence model.
- Develop a biological WMD prevention strategy time tier 0 that will also serve in a dual-use capacity to strengthen health and emergency systems.

2. Recommendations Based on European Union Lessons Learned

U.S. National Health Security Strategic Objectives 1–10 and Medical Intelligence (MI) Strategic Objectives 1–10 should be implemented to include the following:

1. U.S. NHS 1—MI 1 Develop a strategic pre-incident medical intelligence tool such as the "meta-intelligence" model with emerging technology to support intergovernmental information sharing and timely decision making.
2. U.S. NHS 2—MI 2: Recruit and train an NHS workforce of lateral line leaders and pre-incident medical intelligence biological threat-prevention technical experts and strategists.
3. U.S. NHS 3—MI 3: Develop and integrate strategic dual-use pre-incident medical intelligence to support healthcare and civil defense delivery systems to improve public health and safety and prepare for emergency incident use.

4. U.S. NHS 4—MI 4: Develop an intergovernmental communication mechanism using the lateral line system to enhance medical intelligence access and shared situational awareness.

5. U.S. NHS 5—MI 5: Develop a strategic medical intelligence tool to enhance timely communication to support operations in the pre-incident time period.

3. Recommendations Based on the U.S. Tribal Nations Lessons Learned

1. U.S. NHS 6—MI 6: Develop a strategic emerging medical intelligence tool to anticipate potential countermeasure requirements for at-risk populations to support options for deployment of biological threat countermeasures such as antibiotics and vaccine.

2. U.S. NHS 7—MI 7: Develop strategic prevention methods based on timely emerging medical intelligence to support and enhance U.S. biodefense capacity to successfully prevent or counter the terrorist use of biological weapons of mass destruction.

3. U.S. NHS 8—MI 8: Utilize medical intelligence to anticipate the recovery resources and support necessary for community health recovery.

4. U.S. NHS 9—MI 9: Develop an intergovernmental meta-intelligence tool and layered lateral leadership system, a function of liaise control structure that will operate simultaneously and in cooperation with command control structure to enhance intergovernmental cross-border and global health security partnerships.

5. U.S. NHS 10—MI 10: Develop an emerging medical intelligence tool to integrate life sciences research and development for meta-intelligence products, quality improvement, and medical countermeasures decision making that support a U.S. biological threat approach in support of biodefense.

B. CONCLUSION

The first *Quadrennial Homeland Security Review Report* (QHSR) February 2010, identifies key areas that strengthen U.S. homeland security (Napolitano, 2010). Three of those areas are also specific key areas of study in this thesis: (1) shared awareness of risks and threats, (2) unity of effort across all participants in the homeland security enterprise, and (3) innovation through active application of leading-edge science and technology (Department of Homeland Security, 2010).

As life science research and technologies advance and the evolving global threat environment changes, strategically operated decision making in advance of the U.S.'s

adversaries' efforts to destroy the security and public health and safety of the nation becomes crucial to homeland security. A terrorist use of a biological WMD would create a significant and potentially catastrophic threat to U.S. national security. Successful efforts to transform health security policies are no less urgent and essential than protecting large population groups from the consequences of biological destruction. The world is aware of the effects of large scale destruction. Nuclear attack and its real threat remains a constant reminder of mankind's vulnerability to catastrophic events. Biological weapons of mass destruction hold similar destructive capacity, but receive much less preventive attention and concentrated preparation.

The experiences examined by this thesis offer essential clues of how to prevent a WMD attack. They show that it is possible and vital to establish policies that reorient preparations toward prevention rather than response, and that transformative organizational designs are possible and vital to achieving prevention and rapid mitigation. Additionally, these experiences show how effective leaders are able to lead organizations in a collective action that has escaped past efforts to coordinate and integrate across jurisdictional boundaries.

U.S. health security policy is distinctively incomplete without steps in these directions. Prevention is a key factor, but the U.S. policy pays little attention to it. Collective coordination is rare, while organizational turf and disjointed, silo-ridden capabilities are making effective action difficult. Poor leadership is revealed in the numerous instances of disaster planning where successful response is noteworthy because successful response is so rare. This thesis argues that a new biological WMD prevention strategy is urgently needed, shows examples of how that strategy would work, and calls on national and international leaders to step up to the challenge before it is too late.

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APPENDIX. THE META-INTELLIGENCE MODEL AND THE FIVE DIMENSIONS OF META-INTELLIGENCE

A. STRATEGIC META-INTELLIGENCE MODEL

Applying the concept of the five dimensions of the meta-leadership model (Marcus, Dorn, & Henderson, 2006), the following recommendation includes a concept of evolving meta-analysis in order to develop a homeland defense intelligence product to support biological threat decision making. Designed to work in cooperation with the meta-leadership model to address the biological threat, the proposed meta-intelligence model incorporates five dimensions to provide an organizational framework for classifying the layers of a biological threat that need national security intelligence products. The proposed meta-intelligence model includes performing meta-analysis and developing national security intelligence products within the following five dimensions.

B. INTELLIGENCE FOR THE BIOLOGICAL THREAT INDIVIDUAL META-LEADERS

The meta-leader aptitude for the "big picture" identifies a different type of medical intelligence product need. In order to develop medical intelligence big-picture-type intelligence products to support the meta-leader, individual meta-intelligence dimensions must be considered. Not for just senior leaders in the organizational hierarchy, the medical intelligence products in dimension one will serve to form the strategic links and leverages necessary for meta-leaders to guide beyond the crisis.

C. INTELLIGENCE FOR THE BIOLOGICAL THREAT SITUATIONS OR EVENTS

As the biological threat becomes more complex, the biological threat decision making requires more complex critical thinking. The medical intelligence products in meta-intelligence dimension two include factual, evidence-based, actionable intelligence of current barriers, threats, occurrences. Biological threat approach medical intelligence products should be developed that present real-time, evidence-based, and actionable descriptors of the biological threat incident situation based upon time tiers 0–3. These

products would use expanded medical intelligence models similar to the European Union's MedISys methodology and the U.S. Tribal Nations' emerging syndromic surveillance method. Technology such as visual analytics and geo-spatial tools would be used to improve real-time information sharing and multi-jurisdictional organizational native language interpretation needs.

D. INTELLIGENCE FOR THE BIOLOGICAL THREAT CULTURE SILOS

Each biological threat approach silo exists and each organizational silo must serve and contribute effectively to the overall efforts. Meta-intelligence dimension three will develop medical intelligence products that are appropriate and specific to the native organizational language and leadership cultures of the various silos. This seems counterintuitive to the overall target of organizational connectivity; however, specific silos have specific medical intelligence needs. The challenge is that one medical intelligence product, such as the current traditional bio-surveillance system, is not sufficient to serve the meta-leaders' needs for a catastrophic biological threat.

E. INTELLIGENCE FOR THE BIOLOGICAL THREAT CONTEXT LEADING UP

Leaders are necessary at all levels within the organizational silos. The concept that only the leader at the top of the hierarchy requires medical intelligence to address a biological threat is not accurate. Meta-leaders who perform leading up the organizational silo need access to additional medical intelligence products. Meta-intelligence dimension four will develop medical intelligence products that will enable the meta-leader to access diverse biological threat approach intelligence. This intelligence will enhance the meta-leader's capacity to perform critical thinking and to address potential terrorist use of a bioweapon. These products are needed for the layered leadership roles in agency organization.

F. INTELLIGENCE FOR THE BIOLOGICAL THREAT CONNECTIVITY LEADING ACROSS

Additionally, meta-leaders will be required to function outside their organizational silos. The enhanced capacity to perform liaison leadership functions

impacts the overall ability to accomplish the incident mission. To support the required crisis leadership function, meta-intelligence dimension five will develop biological threat approach medical intelligence products which will serve organizational connectivity across the “lateral line.” The liaison and the policy maker across the organizational silos in the biological threat mega-community will need a variety of diverse strategic medical intelligence products, and technology can provide access to those products.

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